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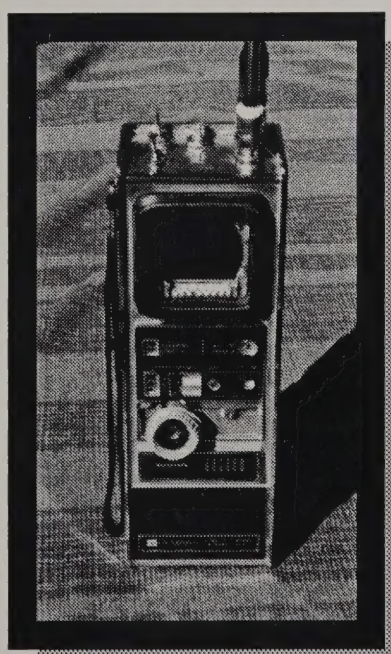

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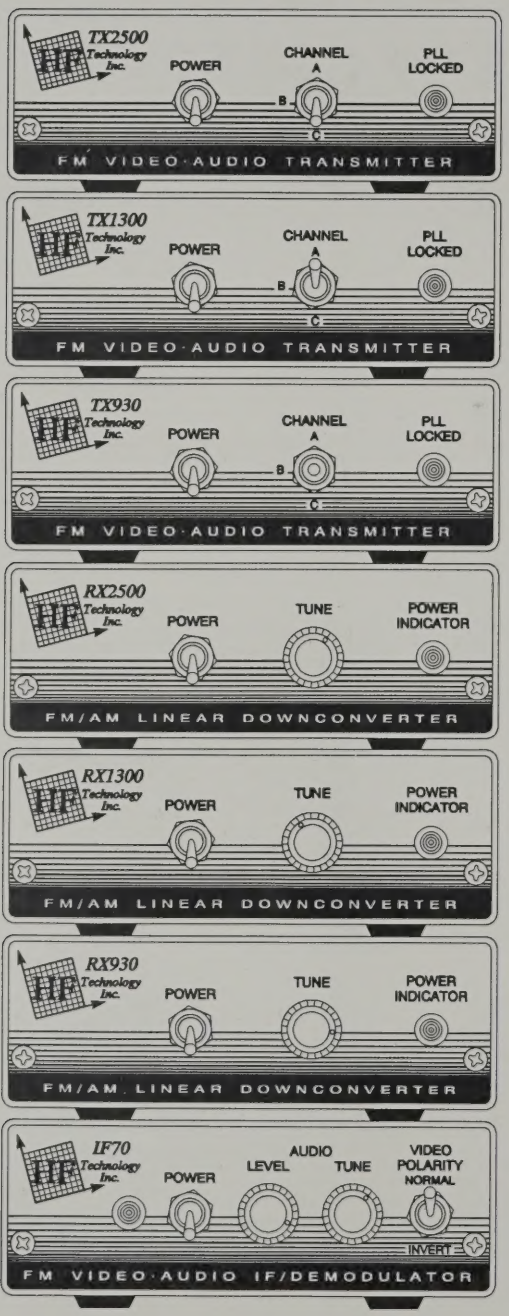

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Amateur Television Quarterly

TABLE OF CONTENTS

Make Mine Margarita's

Gene Harlan - WB9MMM

I hope everyone had a great time over the holidays, and received everything that they wanted. I had two weeks off, and enjoyed every minute of it. My wife Shari (KB9SH - formerly WB9SFT), babysits our grandson, Dustin, now 4 1/2. What a joy to be around this happy child. He brings smiles to our faces every day. He even let me work on this issue over the holidays!

I appreciate the comments that some of you have made either via letters, email, or when you send in your renewals. The one I've gotten more than once is to include more technical articles. This is one reason that I've started the payment plan for technical articles as outlined below. I still have a few articles on hand that I haven't used that Henry passed along, but doing 3 issues in 3 months does use it up pretty quick. At least now we have till April to collect for the next issue. If you are not a writer, but want to see any particular type of article, let me know. We can look for writers with the expertise to write what we need. I would like to find some writers that would write a "column" for every issue, keeping a theme. One idea for a column would be "Getting Started In ATV." There are always people (I get the email with questions) on what equipment to by, how to get started, who is in this part of the country on ATV, and all the other questions that arise. It seems to me that with the average age of hams to be 65 years of age, we need to get the younger generation interested. I think that ATV is a great method of generating that interest. People like to see themselves on TV, so use it the next time you have an Awareness Day. I know you will find that you will hear "I didn't know that hams could do that!". ATV is one of the last groups of hams that still build their own equipment, or at least some parts. Of course that is why ATVQ gets that call for more technical articles.

I was talking to an ATV'er on 2 meters the other day (from a suburb of Chicago) who told me that there is not an organized ATV Club in the Chicago area. I find this hard to believe. Anyone know any different? As I think about setting up for ATV myself (that's right, I'm not on ATV yet, just always had an interest), it would be nice to visit some club meetings to learn more faster.

73 - Gene Harlan - WB9MMM

ATVQ TO PAY FOR ARTICLES!

Payment for Technical Articles

Starting with this issue, ATVQ will pay for certain articles that it publishes. I will outline the policy here, but it will be subject to change as need be to make sure that ATVQ continues to be an ongoing publication. ATVQ will pay $25.00 for technical articles that are published and are a minimum of 2 pages. While this is not a great amount, it is a starting point and I hope it will encourage more technical type articles to be written. Exceptions will be articles that are written by a manufacturer/seller of equipment that is being written about. While I do not want to discourage this type of article, the article itself is an advertisement of the product. Articles from clubs will be encouraged, and I would expect they would like to share their information with the ATVQ readership. Information gathered from the Internet will not be paid for and is mostly small filler items.

First to get Checks

The writers in this issue do not yet know they are being paid, unless they get their check before receiving this issue. So, congratulations on being the first to be paid by Harlan Technologies for their contribution to ATVQ.

Cartoons

We also are in need of a cartoonist, as Robert Beasly is taking some time off, well deserved. I will miss the humor that he shared with all of us in the many amateur radio publications that he served. So, if you are into cartooning, please contact us and/or send us some samples.

Ideas

Does this remind you of an idea for an article that you've said to yourself that you wanted to write, but never did. Feel free to check with us to see if it is of interest, or write and send it in. No guarantees that it will get published, but if you don't try, you will never know. I'll be looking to see what you can do!

'98 DAYTON FRIDAY NITE ATV

The Fast Scan ATV Party/Meeting will be held on Friday May 15, 1998 at 7 pm. The location will be at the West Carrollton Lions Club at 435 East Main Street, West Carrollton, Ohio, which is about 25 min. from the Dayton Hamvention. This event is being sponsored by the ATCO & HATS Fast Scan ATV Clubs. Plan on bringing ATV Video tapes, ATV Club projects or your own ATV project for show and tell. If you get lost call 859-7276 (W. Carrollton Lions Club). For more info contact John Hey at W8STB@concentric.net or 937-859-5294.

Directions. From Dayton head South on 1-75, Take West Carrollton exit #47, stay in right lane, pass football field and Jr. High, At traffic light turn right onto Cedar Street go one block and turn right onto East Main. The Lions Club is the last building on the left (gray).

Directions from Cincinnati, Ohio take 1-74 to exit #44 Miamisburg-Centerville. Stay in middle left hand turn lane and turn left onto route 725. At Alex Rd turn right. After crossing RR tracks go to 2nd traffic light and turn left onto Central Ave. Get in right hand lane, pass football field and the Jr. High. At traffic light turn right onto Cedar go one block and turn right onto E. Main. The Lions Club is the last building on the left (gray). Speakers to be announced later.

DAYTON 98 SATURDAY AGENDA

Room 3, 2:45-5:00 FAST SCAN TV, Moderator: Bill Parker W8DMR. Speakers to be announced later.

AUTHORS GUIDE

Preferred method of receiving articles is from **Microsoft Word**, however **Wordperfect** is OK too. Next preference would be **ASKII text**, followed by **typewritten** or **hand written** (clearly). Diagrams or pictures (B&W or Color) can be sent in hard copy, or if you scan them in, save to PCX or JPG formats (actually I can read about anything). If you send a computer disk, make sure it is PC (not MAC) format.

Articles can be sent to:

ATVQ
5931 Alma Dr.
Rockford, IL 61108

or email to: **atvq@aol.com**

K8DMR 70 cm IN-BAND ATV REPEATER

GRAND RAPIDS, MICHIGAN

by Ron Fredricks - K8DMR email: k8dmr@aol.com

2046 Foxbourogh Ct. NW

Grand Rapids, MI 49504

Most ATVQ readers are familiar with Bill Parker, W8DMR, from Columbus, Ohio, due to the many excellent ATV related articles he has authored in recent years in this magazine. However, it should be noted that Bill's K8 counterpart, Ron Fredricks, is also an avid ATV'er and has been actively promoting this aspect of our hobby in the West Michigan area since 1978. In particular the K8DMR 70 cm in-band ATV repeater has been working very well for almost two years now from Grand Rapids, MI. Helping Ron build antennas, package receivers and transmitters, donate equipment (and cash), install equipment in cabinets, climb towers, etc, have been a core group of local ATV'ers including Joe, N8HNS; Erv, K8EB; Dick, W8IMA; Bruce, N8IRW; Don, N1NBO; Tom, K8YSM; and Dave, KF8QL.

The K8DMR repeater input is 439.25 MHz with output on 421.25 MHz, both upper VSB and horizontally polarized. Eleven poles of filtering are used on both receive and transmit. For receive a special order 4-pole DCI filter is placed ahead of a GaAs FET preamp (to eliminate intermod from nearby amateur and commercial UHF FM transmitters) followed by a 7 pole Pauldon VSB filter and a Spectrum International low-noise downconverter to a cut-apart VCR front end. The latter serves as a channel 2 IF and video output. Baseband video is then input to a PC electronics VOR which in turn keys both the ATV video exciter and a companion separate FM sound transmitter and a host of cooling fans. An Elktronics video generator provides the ID function.

For video transmit a suitably packaged ATV Electronics exciter is filtered via a 7 pole ICM VSB filter and input to a 4 watt pep Pauldon mini-linear amp which serves as a pre-driver. In turn this feeds a Pauldon 440N-2R linear amplifier and a second special-order 4 pole DCI filter which serves as a "final transmit clean-up" filter. Power output out of the DCI filter is about 55 watts PEP on video. A separate 3 watt FM transmitter on 425.75 MHz (an old Hamtronics board), also horizontally polarized, repeats 144.34 MHz two meter ATV coordination audio picked up via a surplus two meter receiver and two meter collinear antenna.

All 70 cm antennas are home-brew using the "Rib-Cage Slot" design that appeared in the June 1986 Spec-COMM magazine article by K4NHN, with omnidirectional gains averaging 6 dB. The video antennas are mounted upside down from one another at the top of a 100 ft. tower. The FM rib-cage is about half way up the tower which is owned by the Grand Rapids Amateur Radio Association. The site is located at the local Red Cross building near downtown but on fairly high ground on a ridge to the east of the Grand River. It is also the Associations HF and VHF/UHF club station site, W8DC. Currently all feeds are with 9913 but the West Michigan ATV group is eyeing some surplus 50 ohm hard line available from a local 2 mtr. repeater group.

P5 repeat coverage is routinely obtained throughout the metro Grand Rapids area. Further stations check in almost every other day from Lansing, Jackson, Saint Joseph, Chicago and Milwaukee, representing airline distances of 70 to 150 miles. Best DX so far both ways has been Cedar Rapids, Iowa last summer.

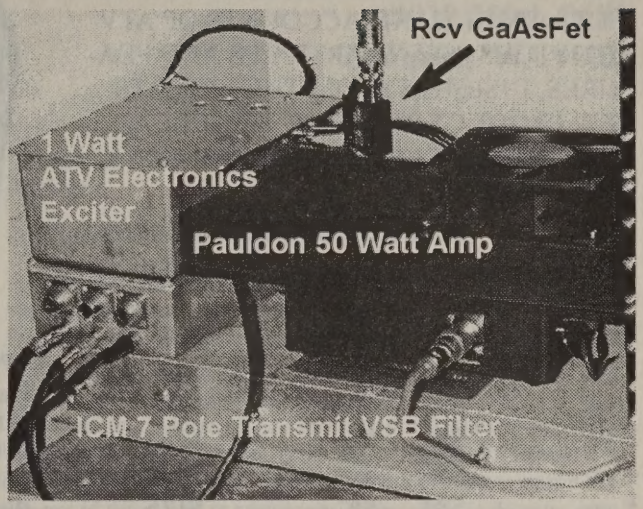
To bolster the contention that an in-band ATV repeater can co-exist with a UHF FM repeater the Grand Rapids Amateur Radio Association had to temporarily relocate their 444.4 MHz out 10 watt local FM repeater to the Red Cross site this fall using a vertical gain antenna about 60 feet up the tower. Besides a 449.4 FM input there was a UHF link from a remote receive site beamed to the Red Cross site in the 433 MHz range. Temporarily the ATV FM sound transmitter has been turned off but full video input and output have been retained with not the slightest de-sense or interference to or from the UHF FM repeater.

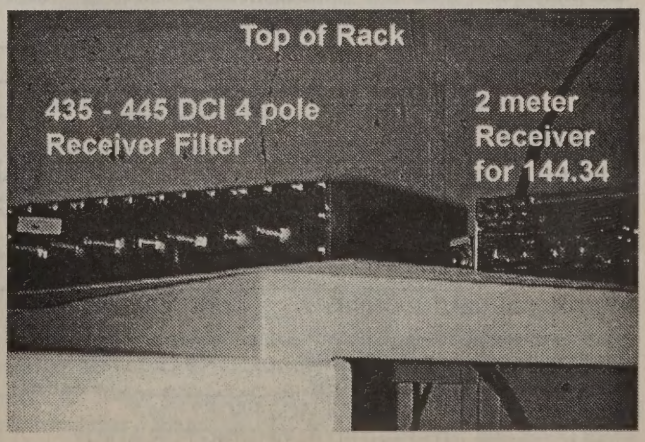
One thing that delayed the inauguration of regular ATV repeater service in West Michigan for a full year was a self de-sense problem that resisted almost all efforts to eliminate, even with split antennas and expensive VSB filters. This was before the separate FM transmitter was installed. Prior to that, Ron's group attempted to use the PLL stabilized FM subcarrier generator that was part of the ATV Electronics exciter board. Sniffing the exciter with a spectrum analyzer probe it was discovered that there were greatly attenuated, but still detectable, harmonics of the sound subcarrier all the way up the band every 4.5 MHz including through the input at 439.25 MHz . Further, these FM subcarrier harmonics, even if 40 dB or more below the primary subcarrier, had the usual video buzz on them. Hence, the repeater receiver's sync activated VOR would always key up. Disabling the subcarrier generator with an appropriate by-pass capacitor instantly made the de-sense problem go away and stay away.

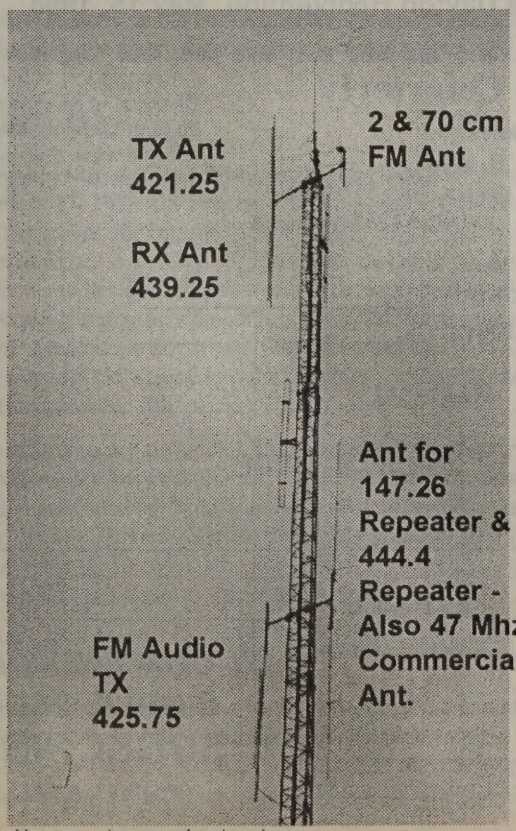
Checking his home station ATV exciter (an old 10 watt Aptron) with the sound subcarrier turned on, Ron saw the same phenomenon on the spectrum analyzer. The same was noted on a small "creepie peepie" type portable ATV exciter. Is it possible that

the near heroic input-output shielding and isolation measures that various repeater groups have had to resort to in order to eliminate de-sense with an in-band repeater could have been vanquished with the flip of a subcarrier disable switch (manufacturers please note)?

Just before Christmas, Erv, K8EB, assembled one of the high-Q tuned single cavities described in the Winter 1992 issue of ATVQ using Ace Hardware plumbing stock. It appears to work as advertised. Ron will be installing it in the receive line of the K8DMR repeater during January to remove any last traces of the co-located 444.4 FM repeater output from the 439.25 received video signal. Other improvements currently planned for the West Michigan ATV repeater system include replacing the 3 watt Hamtronics 425.75 mHz FM sound transmitter with a 10-40 watt commercial synthesized UHF transmitter donated to the repeater group by Dick, W8IMA. The new FM unit, even when run at minimum power, will greatly improve the ATV sound coverage area. Finally Abe, W8HVG, has a couple 100 ft. plus runs of 50 Ohm hardline left over from the linked West Michigan repeater system bearing his call that he has agreed to donate to Ron's ATV group. This will probably mean a few trips up the Red Cross tower in the next month or so to replace the 9913 currently employed for RX and TX by Dave, KF8QL, the group's designated climber (with lots of help, of course, and providing El Nino keeps defrosting the Michigan winter).







Amateur Television Quarterly

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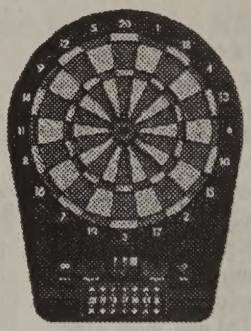

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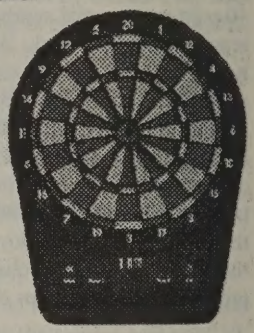

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Displays Cumulative Scores
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Drawing to be held at the ATV Friday night meeting at the Dayton Hamvention, May 15, 1998.

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A VIDEO PATTERN GENERATOR

Part 1 of 2

by Thomas Gould - WB6P email:gould@gekco.com
GEKCO LABS
13019 250th Pl SE
Issaquah, WA 98027

Introduction

Have you always wanted a video test pattern generator for your ATV station but the cost or features kept you waiting for the right unit? The video generator in the following article is a low cost, versatile instrument which can produce a variety of helpful test patterns, as well as source identification or information in text, and can even generate a audio tone. The design allows you to build only what you need so it is very flexible. The least expensive version costs less than $100.

This article is divided into two sections, the first discusses the basics of color video and why do we need a video test pattern generator and what this design can do. In the following issue we will see how the hardware and software functions in this design and get into the construction details.

Video Review

Lets discuss some of the basics of video before we get into detail circuit operation. What do these signals do and why do we need video test signals?

A Little History

Color television was first developed in the United States, and on December 17, 1953, the Federal Communications Commission (FCC) approved the transmission standard, with broadcasting approved to begin January 23, 1954. The challenge for the committee was to design a system to allow the introduction of color broadcasting and allow compatibility with the current monochrome standard already in use. The National Television System Committee (NTSC) came up with the color standard, named after them, that we still use today.

The picture you see on a color TV is actually formed by three electron beams, one each for red, green and blue color and the image is generated by scanning the beam horizontally and vertically over the screen. As these beams are scanned, their currents are changed to create the light and dark areas on the picture tube face which form the image you view.

First let's look at what the color signal evolved from, the black and white composite video signal.

The monochrome video signal is actually a combination of two signal components which are required to form a complete black and white picture. These two components are the scanning control information called synchronizing pulses or sync for short, and the black and white picture intensity information called luminance.

Synchronizing Components

A black and white TV set has only one electron gun. This single electron beam scans the picture tube in an interlaced fashion, from left to right and top to bottom., for 252 ½ lines called a field , then repeats the process to interleave the next 252 ½ lines to create a 525 line interlaced frame. The synchronizing information is a series of pulses which tell the horizontal deflection section when to return to the left of the screen to start a new line, and the vertical deflection section when to return to the top of the screen to start a new frame. This is done by scanning the horizontal at approximately 15,750 lines per second, and the vertical at 30 frames per second (the vertical scan rate is actually 60 Hz, but it takes two trips down the screen to complete one frame). The process of returning to start a new scan is called retrace or fly back.

Monochrome Video (Luminance)

The voltage level of the luminance signal determines the instantaneous brightness of the image on the screen. The negative signal extremes correspond to the dark areas of the picture and the positive signal extremes correspond to the bright areas of the picture. Figure 1 shows the video signal during the time that it takes the electron beam to make one horizontal scan across the screen.

Now lets look at the evolution of the blank and white signal to create color video. The NTSC committee came up with a ingenious way to maintain compatibility with the existing black and white system and add color. A color subcarrier signal was added to the luminance signal.

Color Information (Chrominance)

A color picture tube has three electron guns, red, green and blue. Virtually any color can be created, as well as black and white, by correctly controlling the intensity of each primary color. The color subcarrier is used to encode the red, green and blue information on the camera side and is decoded at the TV to recover the primary colors.

The red, green and blue signals are used to modulate the color sub-carrier (which is ignored in a black-and-white TV) to produce the "color difference" signals, designated R-Y, B-Y and G-Y, which has a frequency of 3.58 MHz in the NTSC system.

Although the type of modulation used on the sub-carrier is of a complex nature if boils down to a simple result:

1. The instantaneous phase of the 3.58 MHz signal determines what color will be displayed (called hue or tint).

2. The instantaneous amplitude of the 3.58 MHz signal determines how much color will be displayed (called saturation).

An obvious question is the phase and amplitude of the 3.58 MHz signal relative to what? The answer is a short burst 3.58 MHz (simply called the burst) which has constant phase and amplitude. The burst will be used to determine the tint and saturation of the color to be displayed.

IRE Unit

Before we get into the details of the test signals we need to define the IRE unit.

This is a arbitrary unit used to describe the amplitude characteristic of a video signal. Television engineers find it more convenient to specify signal levels in IRE rather than millivolts. Pure white is defined as 100 IRE and the blanking level is 0 IRE. NTSC video has 714 mV between blanking and peak white so 1 IRE is 7.14 mV.

TV Test Signals

Video Test signals are very helpful to evaluate a video processing system. A few of the uses are, television monitor setup and alignment, a test pattern to be recorded at the head of a video tape production, so the playback can be adjusted accurately to match how it was recorded, or it could be used as a constant signal on a video transmission link when no live video is needed.

The best and easiest way to evaluate video equipment is with a well-defined, highly stable test signal having known characteristics. All video testing is based on the simple principle of applying a known test signal to the video system or equipment input and observing the signal at the output. The output could be your oscilloscope or a picture monitor. Any distortion or impairment caused by the system is observed and measured on the output signal or seen on the monitor. If there are distortions, the equipment is adjusted to eliminate or minimize them or faulty components need to be replaced and repaired. The end result is that if the system can pass the test signal properly it can cleanly pass picture signals as well.

The signals necessary for such testing are obtained from a test signal generator. This instrument produces a set of precise video signals with carefully defined and controlled characteristics. Each signal is ideal for verifying one or more specific attributes of the video system under test.

Just like anything else in life each test pattern has its job it does well. Here are a few applications and uses for the patterns available on the video generator.

Standard Patterns

SMPTE Bars

SMPTE Bars are split field bars composed of standard EIA 75% amplitude white bars for the top 2/3 of the field, reverse blue bars for the next 1/12 of the field, and the IYQB or "PLUGE" signal for the remainder of the field.

This split-field arrangement allows adjustment of color saturation or color intensity and hue or tint on a color monitor that has the feature to allow the blue gun only. The monitor is set to blue only and the hue or phase is adjusted on the monitor until there is no discernible intensity difference between the reversed blue bars and their adjacent color bars.

The IYQB section of the bottom pattern consists of a 7.5 IRE (black level) pedestal with a 40 IRE "-I" phase modulation, a 100 IRE white pulse, a 7.5 IRE (black level) pedestal with a 40 IRE "+Q" phase modulation, and a 7.5 IRE pedestal with 3.5 IRE, 7.5 IRE, and 11.5 IRE pedestals. -I and +Q phase modulation signals are helpful to assure the subcarrier processing in correct.

PLUGE stands for (Picture Line-Up Generating Equipment). This pattern, at the bottom and to the right side of the SMPTE bars, is used to set the brightness of the monitor. The monitor is adjusted so that the black and blacker than black areas are indistinguishable from each other and the lighter than black area is slightly lighter (the contrast should be at the normal setting). See the figures in the appendix for details of the patterns.

100% White Full Field Bars

The 100% white full field bars are the same as the EIA color bars , except a 100 IRE white level is used. This test signal is helpful to check chroma amplitude versus overall video level. If the system, under test, is setup properly for chroma gain, the tips of the yellow and cyan bars should be at 100% level matching the white bar peak amplitude.

75% White EIA Full Field Bars

The EIA color bars are a part of the EIA-189-A standard. The seven bars (gray, yellow, cyan, green, magenta, red, and blue) are at 75% amplitude, 100% saturation. Each color bar uses 1/7 of the image area.

Window

The window pattern consists of a white rectangular area in the middle of the screen surrounded by black. This pattern is good for testing low frequency response and video tilt as well as the performance of video clamping in the video processing system.

Red, Green, Blue and Black Full Field

These patterns are full image screens of red, green, or blue. These are helpful in television monitor testing to see if there are

any purity problems. If there are problems, you would see off color areas rather than full saturated vivid colors throughout the screen.

Enhanced Patterns

Multiburst

The Multiburst signal is great for quick measurement of the frequency response of the system. The signal typically includes six packets of discrete frequencies which fall within the TV passband. The packet frequencies usually range from 0.5 MHz to 4.1 or 4.2 MHz, with frequency increasing toward the right side of each line.

Cable Sweep

Cable Sweep is another frequency response measurement signal. Rather than discrete packets, as in multiburst, this signal has a continous sweep of frequencies from 1 to 4.5 MHz. There are frequency markers on lines toward the bottom of the screen. These are helpful to determine where your roll off occurs.

NTC 7 Combination

The NTC (U. S. Network Transmission Committee) developed a combination test signal that may be used to test several NTSC video parameters, rather than using multiple test signals. This test signal is cleverly called the NTC-7 Combination Test Signal and consists of a white flag, a multiburst, and a modulated pedestal signal.

The white flag has a peak amplitude of 100 IRE and a width of 4 us. The multiburst has a 50 IRE pedestal with peak-to-peak amplitudes of 50 IRE. The starting point of each frequency packet is at zero phase. The width of the 0.5 MHz packet is 5 us; the width of the remaining packets is 3 us.

The 3-step modulated pedestal is composed of a 50 IRE luminance pedestal with three amplitudes of modulated chrominance (20, 40, and 80 IRE peak-to-peak). The rise and fall times of each modulation packet envelope are 400 Ns.

Modulated Stair Case

The 5-step modulated staircase signal, consists of 5 luminance steps. The peak-to-peak modulated chrominance is 40 IRE. The modulated chrominance has a phase of 0 relative to burst. Note a 0 IRE setup is used. The rise and fall times of each modulation packet envelope are 400 Ns. This test signal can be used for measuring differential gain and non-linear luminance variations in a system.

Modulated Ramp

The modulated ramp test signal, is composed of a luminance ramp from 0 IRE to either 80 or 100 IRE. The 80 IRE ramp provides testing of the normal operating range of the system; a 100 IRE ramp may be used to optionally test the entire operating range The peak-to-peak modulated chrominance is 40 IRE. The modulated chrominance has a phase of 0 relative to burst. Note, a 0 IRE setup is used. The rise and fall times at the start and end of the envelope is 400 ns. This test signal is can also be used to measure differential gain and is good for measuring analog to digital bit errors in digital video systems.

Cross Hatch

This pattern generates a matrix of horizontal and vertical lines helpful for adjusting monitor convergence. Since a white line on the screen is made up of red, green and blue components, each picture tube electron gun must have their respective beams aligned perfectly, overlaid on each other or you get hallows around the misaligned image areas.

Center Cross with Safe Area

This signal is similar to the Cross Hatch but is used to define the safe image. Your video production should not contain any picture information outside of the safe area or your viewers may not see it. The television monitor should show the entire safe area or it needs adjustment.

Bounce

This test signal is great to test the low frequency and clamp response of the system. The video signal will vary from 0 IRE to 100 IRE at a 1 second rate. The video signal should not distort or clip under either condition and maintain a constant sync tip level if the clamp circuitry is functioning properly.

The television monitor should not change brightness or width with the widely varying average picture level of the bounce signal.

Test Signal Matrix

The Matrix pattern is a combination of the patterns we have discussed previously. There are approximately 48 lines of each test pattern to make one image comprised of 5 different patterns. The 5 patterns that make up the matrix are, NTC7 Composite, Color Bars, Red, Green, Blue and 50 IRE flat signal.

Test Pattern Specifications

Standard Patterns

SMPTE Color Bars

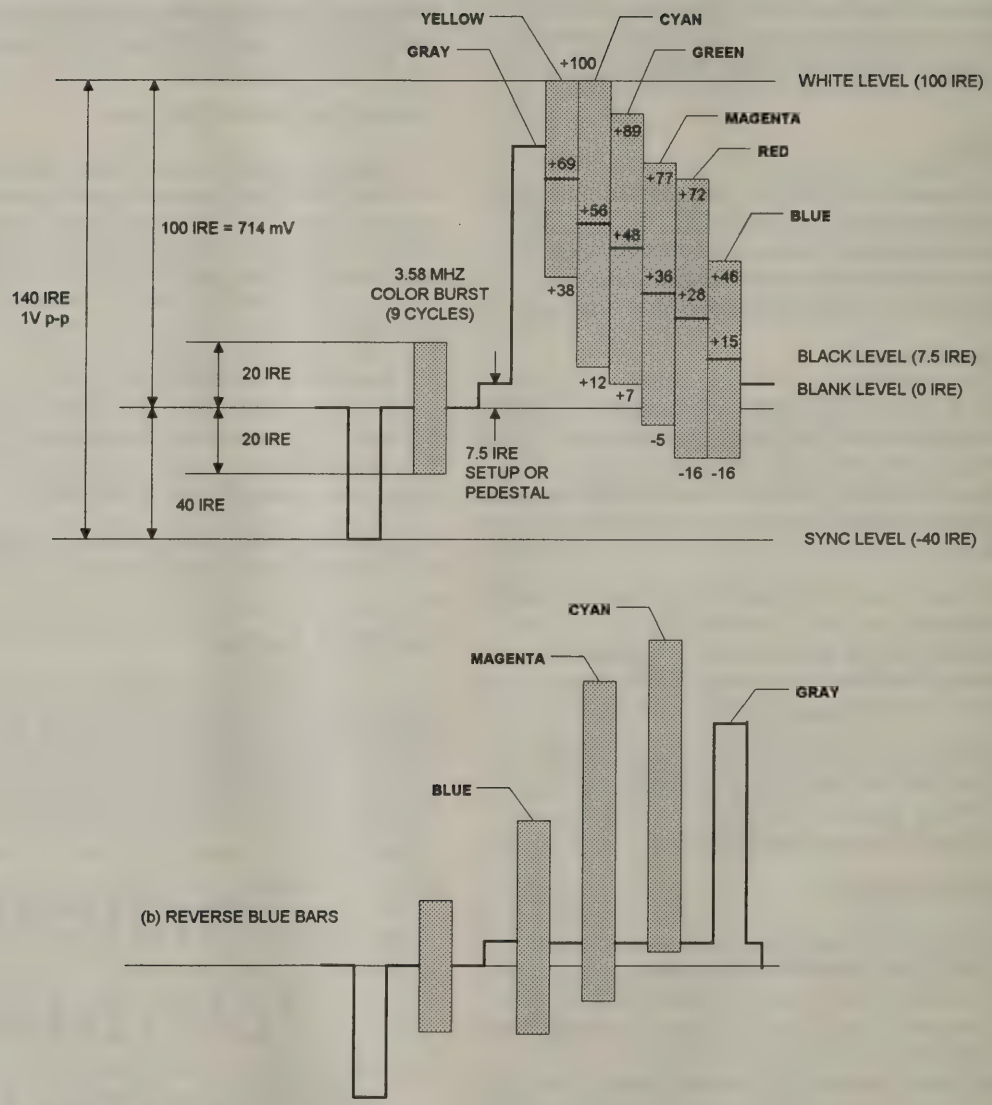


Figure 1. SMPTE Color Bars

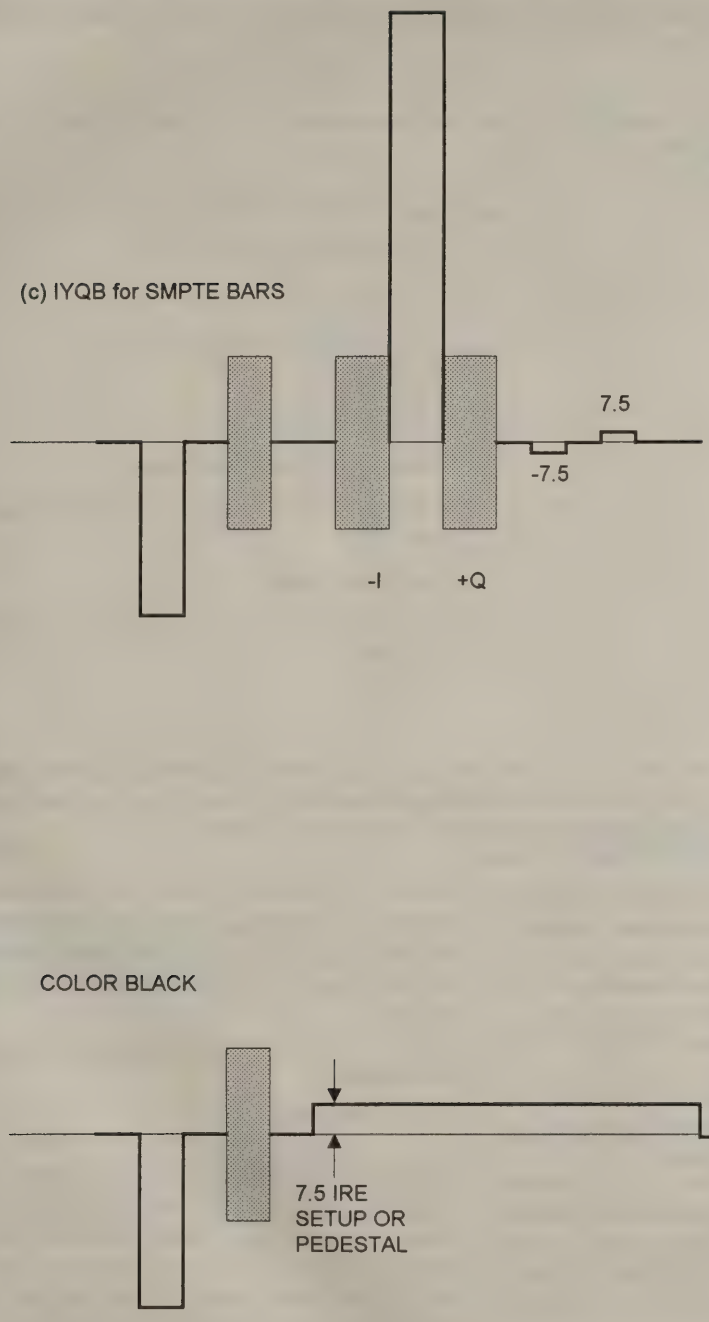


Figure 2. Color Black

A Video Pattern Generator

The generator described in this article is designed so that the builder can construct as simple a unit as generating black video or as complex as a multi-pattern image with characters and audio output. The following discussion will detail how to build the generator to create basic black video and the very popular SMPTE color bar pattern. The complete design has the following features.

Features

This design can generate, NTSC (RS170A) Composite Color Video and simultaneous Y/C (S-Video) outputs. You can use a plug in 9VDC transformer or a external DC supply from 8 to 13.5VDC.

Available Test Patterns

- ✦ SMPTE Color Bars with pluge
- ✦ Color Black with 7.5 IRE setup
- ✦ Full field Color Bars 100.75
- ✦ Full Field EIA Color Bars 75.75
- ✦ Red Field
- ✦ Green Field
- ✦ Blue Field
- ✦ White Window
- ✦ Multiburst
- ✦ Cable Sweep with markers
- ✦ 5 and 10 Step Stair Case
- ✦ Modulated Ramp
- ✦ Cross Hatch
- ✦ Center Cross with Safe Area
- ✦ Bounce
- ✦ Test Signal Matrix

Character Identification Display

- ✦ 12 Character On screen Display with changeable text, from front panel.

Audio Tone Output

- ✦ 1 kHz Audio Test Tone Output, Odbm nominal output level (adjustable)

Theory of Operation

This design takes advantage of large scale integration and is built around a video encoder integrated circuit from Brooktree Corporation, the BT866. This IC has two digital input ports and 3 analog output video ports and even a internal color bar generation function. It can also generate closed caption data but that is beyond the scope of this discussion.
Refer to the block diagram in figure 3 for the following discussion:

The video pattern generator creates the composite video waveforms, described earlier with the following functional blocks.

The functional blocks are from back to front, Video Encoder, SRAM Pattern Memory, Eprom Pattern Memory, On Screen Display, Memory Control, and the Microcontroller.

Let's start from the back end and work forward in our detail discussion of how this unit works. The Composite Video and S-VHS outputs are generated by the Video Encoder.

The Video Encoder generates the analog video from digital data from one of two input ports. The two ports are called Pixel Data and On Screen Display data or OSD for short. These two data streams come from the Pattern Memory.

The Pattern Memory stores the digital information to create the waveform and presents the data to the Encoder. This design has two sources of Pattern Memory, Static Random Access Memory (SRAM) and Electrically Programmable Read Only (EPROM) Memory.

The Memory control and Microcontroller use the sync signal from the Encoder for timing information and control the Pattern Memory to provide the digital data to the Video Encoder at the proper time.

Hardware

Video Encoder

The Video Encoder has a number of built in functions, a sync generator, digital signal processing and the digital to analog conversion to create the composite video waveform. The sync signals are created in the encoder and the video waveforms can come into two ports, a pixel data port and an on screen display (OSD) port. One bit on the OSD port determines which port is used and can be dynamically switched. The encoder block adds sync information to the selected input port data and creates the composite video waveform. The combined digital signal is converted to analog and adjustable on the output. Since the encoder generates the sync signals it is the master timing source for the pattern generator.

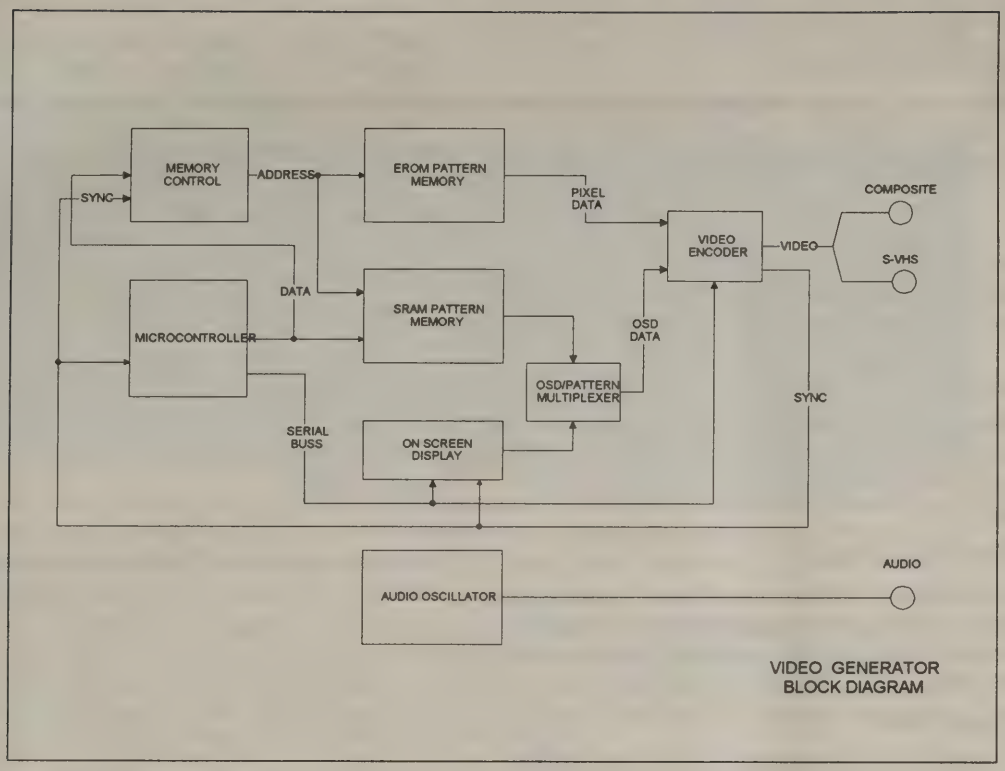


Figure 3. Functional Block Diagram

Sync Generation

The Encoder is programmed to generate Vertical and Horizontal Sync, and Composite Blanking for the Microcontroller, Memory Control functions and On Screen Display. A IIC bus is used to program the encoder by the microcontroller.

Digital to Analog Conversion

The Encoder has three D to A converters. One for the Composite Video, Luminance (Y) and Chrominance (C). The digital input data is 2 times over sampled and converted to analog at a clock rate of 27 MHz.

Output Video Filtering

Since the video encoder generates analog signals from a digital source the analog output contains digital samples or discrete steps. The analog filters on the output smooth out the discrete steps.

Control Functions

Microcontroller

The micro controller's function is to initialize the peripherals, load the static ram display memory, and actively control the line pattern to create the test pattern.

The microcontroller has the following jobs:

dynamically select the proper video pattern line to display

create the video line pattern and store in static ram memory

monitor the front panel switches for pattern control and OSD creation and control

initialize and program the video encoder

initialize the On Screen Display

Front Panel Interface

The Front Panel switches are read by the microcontroller on the data bus by a bus transceiver. The switches allow pattern selection and On Screen Display control.

Memory and OSD Control

The Memory and OSD Control block perform the pixel memory address generation , pixel clock division and OSD data control.

Video Pattern Generation

There are two sources of the pattern image. One for the OSD port and one for the pixel port. The video encoder either converts the OSD port or the pixel data port to analog video with sync.

OSD Port

The On Screen Display (OSD) port memory is a smaller memory for less complicated patterns. The port is 4 bits wide where one bit tells the encoder to take data from the OSD port or Pixel Port.

Pixel Port Memory

The pixel port memory is used for the more complicated higher resolution video patterns. The pixel data rate is twice the rate of the OSD port and the data width is much greater so it takes more memory.

Character Generation

The On Screen Display (OSD) is a stand alone character generator. The OSD receives synchronizing information from the Encoder and generates the video pattern and the proper timing to display previously created character text strings.

Audio Generation

The audio source is created by a Wein bridge 1 kHz oscillator. A dual op amp driver is used for balanced audio output.

Power Supply

Power to the unit is available through an external AC to DC plug in transformer. 9 to 12 VDC is required at the power connector. An internal regulator powers the main circuitry and the audio section has a negative supply provided by a simple switching supply circuit.

Software

Software Outline

Initialization

Initialize Data Ports

Load the Encoder Look Up Table

Initialize the Encoder

Initialize the On Screen Display

Load Memory with patterns

Enable Memory Control logic

Enable interrupts

Pattern Generation

MAIN ROUTINE

The main routine reads the front panel switch value in memory and then looks through the frame pattern lookup table to set the line address accordingly. The horizontal lines are counted to keep track of which line we are generating to address the pattern memory accordingly. Horizontal sync from the encoder is used for counting horizontal lines.

Interrupt Processing

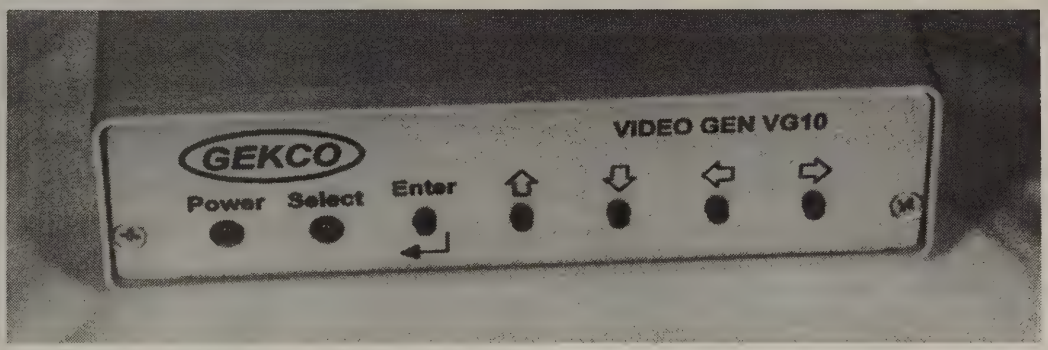
The external interrupt is caused by vertical sync from the encoder.

The external interrupt routine reads the front panel switch and stores to memory for later use. It also clears "LINECNT" variable which is used to count horizontal lines for the line pattern memory address generation.

Stay Tuned

In the next issue we will conclude by discussing the detail circuit operation and get into construction details.

VIDEO PATTERN GENERATOR VG10



The VG10 is a low cost Television Test Signal Generator, well suited for Amateur Television or any application where a good test signal is required. This design takes advantage of large scale integration, which provides you with a low cost, high quality video generator, and passes the savings on to you.

The unit is modular with a variety of configuration options so you can pick the functionality you need. You can even assemble the unit yourself for additional savings. The configuration options range from the basic unit, which provides color black, to the enhanced unit with many video patterns, character/message displays, and audio tone output. Purchase the (standard unit) and add any combination of options to build the system you need.

Common Features

These features are common to all configurations.

- 9-bit digital signal processing video generation
- Simultaneous composite BNC and Y/C (S-Video) outputs
- AC or DC power supply

Configuration Options

Standard Version Model VG10-STD, (only $99 for Kit)

- SMPTE color bars with pluge
- Color black 7.5 IRE setup
- Video standard, NTSC (RS170A)

Multiple Test Patterns, P/N OPT1 Option 1, (add $49)

- 8 Patterns
- SMPTE color bars, Full Field color bars, Full Field EIA color bars, White window, Red, Green, and Blue field, Color black with 7.5 IRE setup

Enhanced Test Patterns, P/N OPT2 Option 2, (add $69)

- Multiburst packets, 0.5,1.0,2.0,3.0,3.58,4.2 MHz
- Cable sweep with markers
- Stair case 5 and 10 Step
- Linear Modulated Ramp, 0 to 100%
- Cross hatch, 14H x 17V
- Safe Area with Center Cross
- Bounce
- Test Signal Matrix

Character Identification Display, P/N OPT3 Option 3, (add $69)

- 12 Character On screen Display with changeable text from front panel.

Audio Tone Output, P/N OPT4 Option 4, (add $49)

- 1 Khz Audio Test Tone Output, Odbm nominal output level (adjustable)

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Errata to my translation of F6IWF's article

John Jaminet - W3HMS
email: W3HMS@aol.com

Hello Gene.....I received a letter from Ed, WA4DFS about the values of parts for the video inverter which appeared on page 18 of ATVQ Fall 1997.

Some are difficult to read so in addition to sending same to him via mail, it would be good to publish the values for the difficult to read parts as follows in the next edition:

R1=75 ohm
R2=39k
R3=10k
R4=330
R5=150
R6=330
R7=75

73, John W3HMS

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1997 Eleventh Annual ATV Banquet
Litchfield, Illinois

by Scott Millick - K9SM - email: smillick@cillnet.com
Central Illinois/St. Louis Area ATV Club
907 Big Four Ave.
Hillsboro, Illinois 62049

With Christmas rapidly approaching and a Happy Thanksgiving just celebrated, the Central Illinois/St. Louis Area Amateur Television Club celebrated its eleventh annual banquet. With good weather the dedicated group of ATV operators and their wives enjoyed another night of friendship and meeting new members. The banquet was held at the Ariston Restaurant in Litchfield, which is the central point for the club, with members coming from the Champaign, Bloomington, Salem, Peoria, Il. and St. Louis, Mo. areas. John Benitez, KE3XB came the farthest distance, Bridgeville, Pa.. There were 40 members attending from four states.

Part of the 1997 Central Illinois/St. Louis Area ATV Banquet

Activities began at 5 PM with Happy Hour and WB9QLY, Kathy Millick, registering the guests. As they arrived from the distant points members made and renewed acquaintances telling stories about their last years activities .

At 6:30 PM Scotty, K9SM, called the group to order. After that the clatter of dishes glasses, and utensils and chit chat continued during the course of the main meal and dessert.

The program portion began with the joke award presentation. Recognition was given to Jay Finn, W9JF, who along with K9SM go to Dayton every year. That provided an interesting tale with Jay receiving a toilet plunger for next years trip.

K9SM (left) presenting annual ATV Operator of the Year to K9RRP

The seventh annual Central Illinois/St. Louis Area ATV Operator of the Year was presented to J. Ray Young, K9RRP, from Salem, Il. Ray has been on ATV for several years, and is always around to help those who need it. He is active in the local Centralia Wireless Radio Club and is always seen at the local hamfests.

Mark Garrett, KA9SZW, provided a program on an upcoming balloon launch. Angel Medina, KB9PMT, displayed the El Nino II package and explained what it had aboard and how it worked. He also spoke about their future balloon flights.

The prize portion was next with the famous double draw and a new method of awarding prizes, heads and tails, which provided a lot of fun and laughter.

With all the prizes passed out, farewells were said and everyone made their way home with the banquet scheduled for November 28, 1998.

KA9SZX, Mark Garrett (left) explaining the future balloon lauch with Angel Medina, KB9PMT, holding El Nino in his right hand.

ATV'ers Night Vision

With the new CCD cameras in the .03 lux range and sensitivity to infrared, this was a natural to rise from the junk box.

After experimenting with LED's as an indoor light source, I decided to go for some outdoor range. At a hamfest, years ago, I picked up a surplus IR illuminator, which consisted basically of a 12 volt, 120 watt automotive style headlight, enclosed in an aluminum shell with an infrared filter over the front. I understand that the filters are still sold by some of the surplus outlets, so this should be easily reproducible. The junk box also produced an old camera viewfinder and shoulder mount.

I mounted the lamp, CCD camera and camera view finder on the shoulder mount to produce an interesting new source of video for the ATV net. All components operate from 12 volts, so for portable use it was a cinch. The current draw of the IR lamp precluded any form of internal battery so I used a cigarette lighter plug as the power source and have operated portable with a strap mounted battery pack . The unit has a video output for VCR or direct to an ATV transmitter.

The unit throws a beam that is comparable to a headlight, when viewed in infrared, of course no one else but you, and the other ATV'ers, can see it
Design by: WD5BJW
Demonstrated by: KD5BPU
Digital Photography by: KD5BLS

HATS NEWSLETTER JANUARY 1998

(Edited)

NEXT MEETING: Wednesday, January 14, 7:00 p.m.
Conference Room, Fujitsu Systems, 9th Floor
5718 Westheimer @ Bering (Coastal Banc Bldg.)
(Free parking in the garage)

TELEVISED: On 1.2 GHz and 421.25 Mhz
If you can't attend, monitor the meeting on ATV and participate via 146.700 FM

WEB PAGE: **www.stevens.com/hats**

HAPPY NEW YEAR!

AND I trust everyone had a wonderful holiday season, be it Christmas, Hanukkah, New Year or whichever is observed. To all I wish a belated Happy, Happy, Happy!

SPEAKING OF THE HOLIDAYS... Didja' ever read the directions on some of this stuff? I received a beautiful fruit basket upon which was an envelope of "Holiday Gourmet Coffee" ..the directions state "Empty the contents of pouch into the filter basket of a 10 or 12 cup coffee maker. Store remaining coffee in an airtight container in the refrigerator or freezer."

Now I ask you.. If I empty the contents, how will I have any remaining?? Is it possible the writer of those directions could also be the writer of our radio and computer tech manuals? hmmm...

LET'S HEAR a loud "HAPPY BIRTHDAY" for Rolland McGinnis, W5PZP, born in the month of January! And if your callsign was missed, be sure to notify the editor so you won't be missed next year.

AND HOW ABOUT a big round of applause for Fred Juch? Fred noted the repeater antenna(s) seemed to be out of whack, braved the cold and straightened two antennas which seemed to have received more than they could stand of the strong winds.

THE DECEMBER MEETING had a small attendance.. probably lots of folks preparing for the upcoming holiday season.

The primary topic of discussion was the upcoming Houston Marathon, January 18. We're all praying our weather watchers will predict (and follow through with) weather somewhat warmer than experienced in the '97 run.

We also discussed HATS' next project (next but already in the works) ..the 2.4 gig transmitter. This will be an exciting step upward for HATS.

DO YOU have internet access? Have you visited our Web site lately?

Fred has recently made updates. Check it out! Access the HATS site by going to **www.stevens.com/hats** ...check out all the latest event photos snapped by Fred and his digital camera!

THAT'S ALL FOR NOW... See you at the HATS meeting this coming Wednesday, January 14, 1998!

Bill Rister
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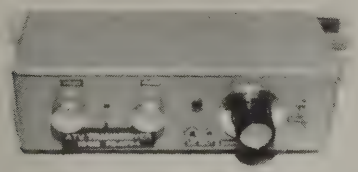

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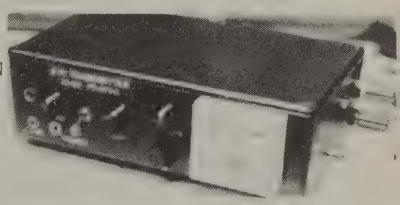
- SWITCH SELECTION OF (2) FREQUENCIES (439.25 ,, 434.00).
- YOU MAY SELECT OTHER FREQUENCIES IF DESIRED.
- TOGGLE SWITCH - 10 AMP CAPACITY. RELAY CONTROLLED OPERATION.
- A "RED" XMIT LIGHT WHEN TRANSMITTER IS OPERATING.
- VIDEO AND AUDIO LEVEL CONTROLS ON FRONT PANEL.
- BNC JACK FOR VIDEO BACK PANEL 1/8" JACK 3/32" FOR MICRO PHONE USE.
- SUB CARRIER SOUND WITH RCA JACK FOR LINE AUDIO INPUT.
- POWER MODULE OUTPUT,
- AVERAGE VIDEO OUTPUT 3-4 WATTS.
- RED BINDING POST (1) VOLTAGE 12-13.8V.
- BLACK BINDING POST (-) GROUND.
- METERED 0-50 FOR POWER OUTPUT OBSERVATION.
- SAMPLING POWER AND VIDEO LEVEL CONTROLS ON FRONT PANEL.
- ANTENNA "N" CONNECTOR IN BACK.
- DOWN CONVERTER JACK LOCATED ON BACK PANEL.



- **PRICE: $305.00 (1) XTAL**
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TRANSMITTER DESIGN DESCRIPTION

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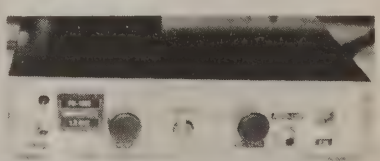

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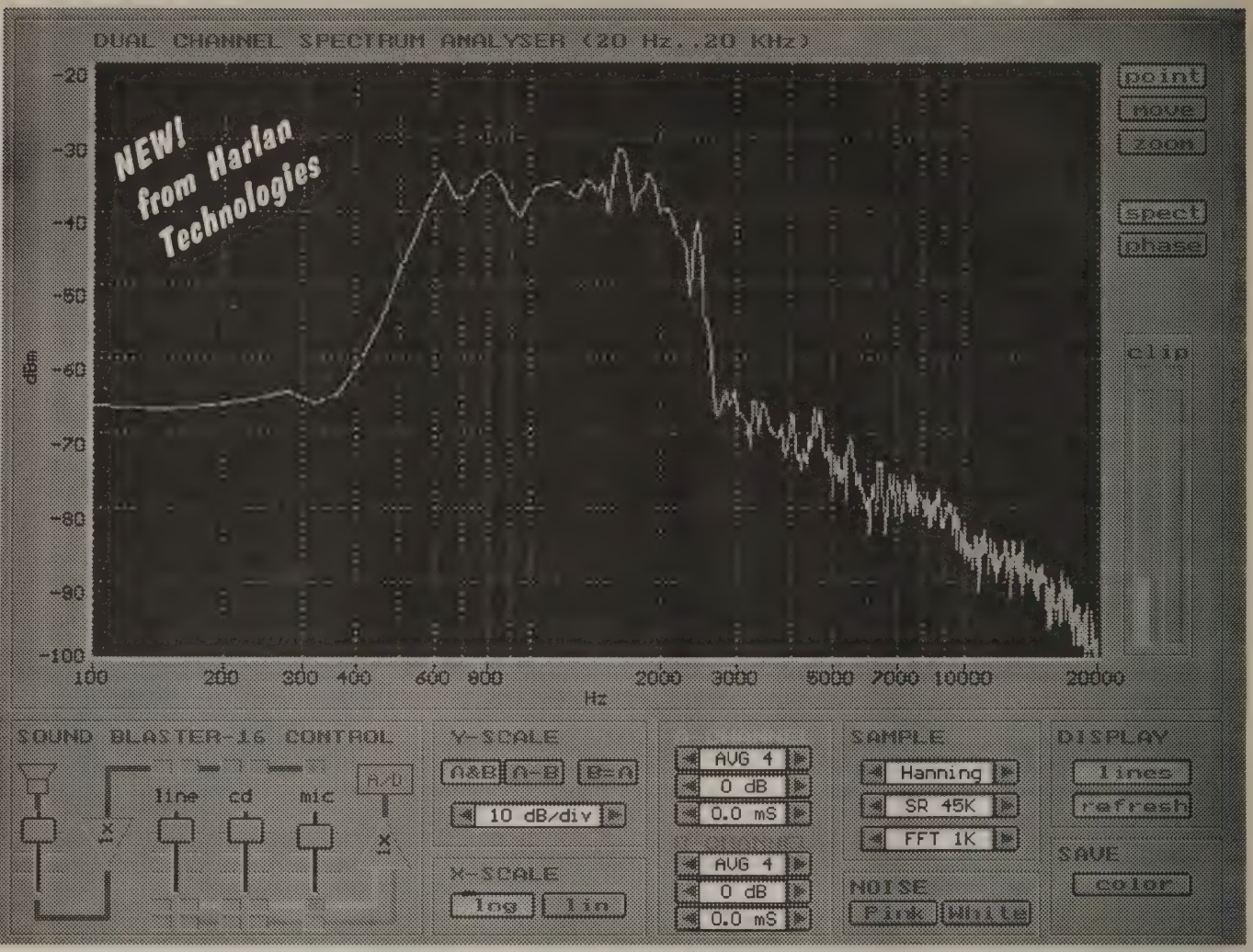
Completed unit $325.00



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COLOR WALKIE LOOKIE

by Bruce W, Forsberg - WB6IZG email: wb6izg@qsl.net
11178 Batavia Circle
San Diego, CA 92126

The following is a project I have been working on for about 1 year now. It has to be the most fun project that I have worked on to date. Most projects I have attempted have either been way to complex or a bought kit. The projects that were too complex just frustrated me and the kit approach taught me nothing but how to solder. I was looking for a project that I could handle, but be more interesting than just a soldering lesson. The inspiration for this project came from the book "ATV Secrets Volume II" by Henry Rue where several walkie-talkie type units are described for ATV. It seemed that this would be the perfect project. It is not too complex since it uses the building block approach. In fact it requires little electronics background at all since it is really a systems integration type of project. It also seemed like a great project since the uses and possibilities are endless. This article will not be a step by step guide, but will instead be a lessons learned article and serve to inspire others to take up this kind of project as well. One other thing, this project is by no means finished. It is just getting started.

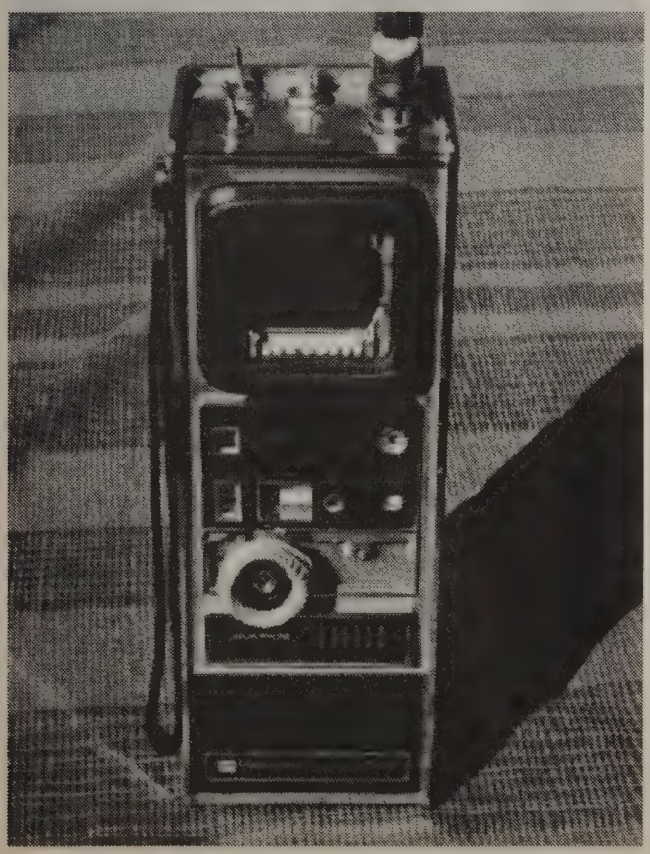

Figure 1

The goal of this project was to build a complete 434 MHz color ATV system with audio in a package that would fit into a CB type walkie-talkie case (see figure 1). 434 MHz was chosen since this is the input frequency used for many of our ATV repeaters here in Southern California. It also had to be expandable. In the future I would like to be able to add a 1.2 GHz downconverter. This is the band used for the output of most of the ATV repeaters here in southern CA. The output of this unit must be sufficient to drive an external amplifier. Last, I wanted the ability to transmit and receive at the same time for testing purposes.

The following is the list of items used in the Walkie Lookie:

Color Video Conferencing Camera	AT&T model 200-NTSC
Electret Microphone	
Radio Shack 2.3" LCD color TV	Optimus 16-176
80 mw 434 MHz Microtek ATV TX Electronics model ATVM-70	P.C.
4.5 MHz Microtek Audio Subcarrier Electronics model MSC-2	P.C.
445 MHz 5/8 Antenna model CH-72S	Comet
9 V Nicad Battery Shack Hi-Capacity	Radio
1.5 V AA Nicad Batteries (8) Shack Hi-Capacity	Radio
Used CB Walkie Talkie	Bought at Ham club auction

The only items no longer available are the TX and audio subcarrier boards. These boards were designed by KC6CCC and they are no longer available from P.C. Electronics. But I have seen other sources for small ATV TX boards for the 400 MHz band. These particular TX and subcarrier boards were chosen because of their small size. Both are about 1 inch square and can be sandwiched back to back using double sided tape. Figure 2

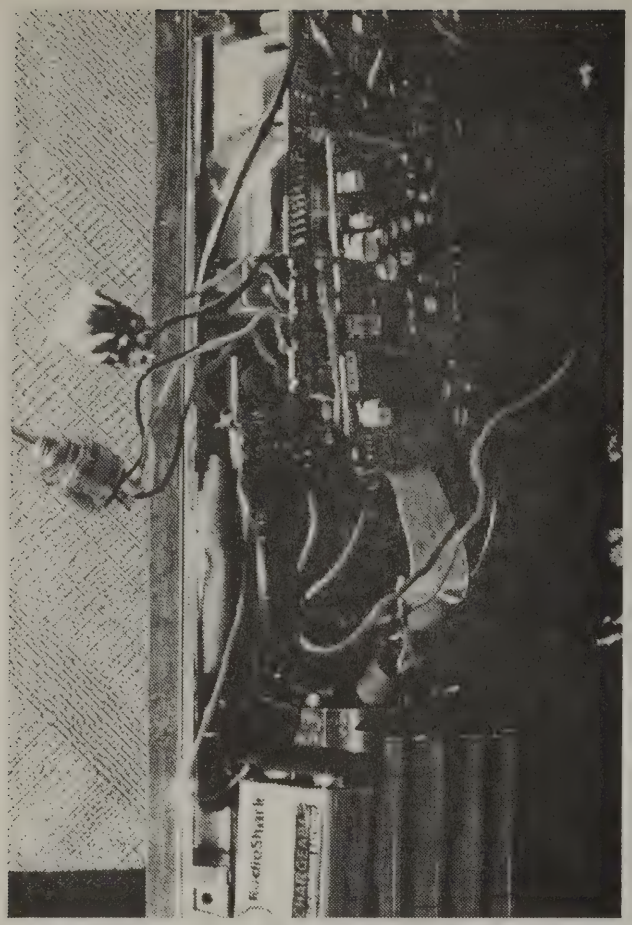

Figure 2

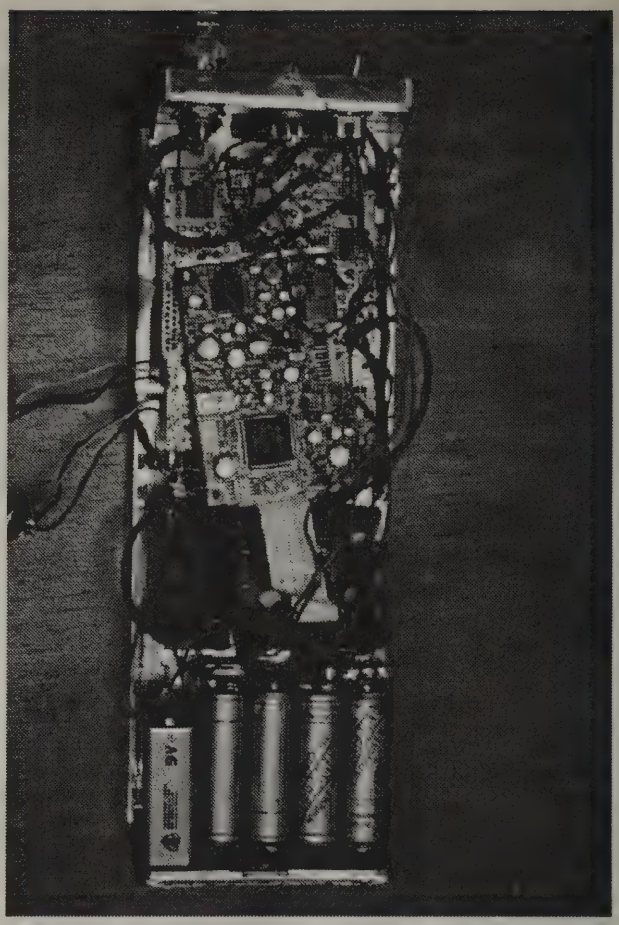

Figure 4

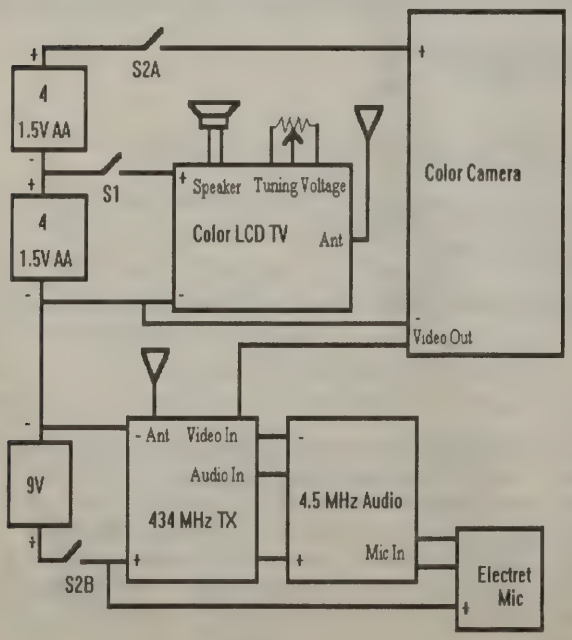

Figure 3

shows the inside of the Walkie Lookie. On top is the camera board, followed by the LCD TV board under it, followed by the video and audio TX boards. Figure 3 shows a block diagram of the complete unit as it is now. Figure 4 shows the complete inside of the unit. The two pots on the side control the backlight of the TV and the audio volume. They are there for just experimentation now and will be mounted in a permanent location when finished.

When starting out on a project like this I worked on the receive part first. Using the 430 MHz band to receive is convenient since this is just below the UHF TV band (470 MHz - 806 MHz). Most of the analog LCD TV tuners will tune down to these ATV frequencies. When you buy an LCD TV the first thing to do before you tear it all apart is to transmit on the frequency that you will be using and make sure that the receiver will tune down this low. If not take it back and try another model. Also don't transmit too close to the receiver or with too much power or you might overload the receiver and see your transmission on more than one frequency. To mount the TV I simply removed it from its plastic case and placed it into the CB case. I fastened it to the case using double sided tape from

Radio Shack. This works very well and serves to both fasten it to the case and insulate it from the case as well. It happened to fit very nicely in my CB case. In fact right where the TV is was the speaker grill on the case. So all I had to do was to knock out the speaker grill so I could see the TV. Then all I had to do was mount the speaker in a location that I could hear the audio and wire it back to the TV unit. The most difficult part of the project was to find the tuning voltage for the TV. I had decided that I wanted to be able to tune it with a potentiometer. These units usually come with up/down switches that tune up or down the band. When power is removed and reapplied the TV's don't remember the last frequency they were on. Since, when I transmit with the unit, I planned on turning the TV off to conserve power it would be a hassle to have to tune the frequency each time. So I decided to use a pot. To find the tuning voltage look, for a long metal case that is mounted on the PC board of the LCD TV. This is the TV tuner. Using a volt meter examine the DC voltage of each pin on the TV tuner while the TV is in the tuning mode. When you find a pin whose voltage is changing while the TV is tuning, this is the tuning voltage control. It should go from about 0 V to 30 V while tuning the entire band. On my unit, there is a resistor right on the pin of the TV tuner. I cut the trace on the other side of the resistor. Then, since the low end of the tuning voltage corresponds to the low end of the UHF band, I simply used the supply voltage of the TV to go to a pot that supplies the TV tuner with the tuning voltage. If you wish to be able to still tune the entire TV band, then you will need to find a very small voltage regulator on the PCB. It should be not to far away from the tuner. Just search each pin until you find a constant source of about 30 V. You can use this. As I said before, this was the most difficult part of the project, so take your time and plan out each step.

The next step of the project was to figure out how to supply power to all the units. Below is a list of the units that required power.

TV	6 V
TX	9 V
Camera	9+ V
Mic	1+ V

Each one required a different voltage. I thought about using a 12 V nicad pack and voltage regulators for 6 and 9. But, I didn't want the power loss associated with these. I also thought about DC-DC converters. But none were small enough for the current that I required. So I settled on using, in effect, 2 separate battery packs. 8 AA nicads would supply 6V and 12V high current to the TV and camera. A 9V nicad would supply low current to the ATV transmitter as well as the Electret Mic. The mic could use just about any low voltage. Although this setup has the disadvantage of two separate battery packs, it does eliminate the power losses that would be present otherwise. I also decided to use the new Hi-Capacity nicads from Radio Shack. Although

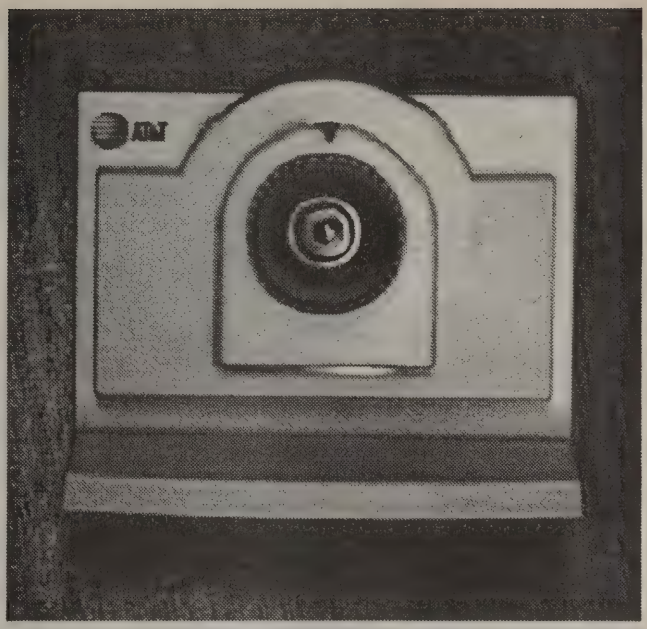

Figure 5

more expensive they provide for more capacity then normal nicads. The ATV transmitter lasts 1.5 hours on a 9 V nicad and the camera lasts almost 4 hours on the 8 AA nicads.

As far as the camera was concerned, it was decided to go with a color camera. If you are going to build one of these to demo ATV, spend a little more money for the color camera. Certainly a B/W camera could be used but color adds so much more. A B/W camera can be had with very small dimensions plus low cost. I think this is why many people use these. But, if you shop around you can find good color cameras for about $100. I bought three like the one in figure 5 for $100 a piece new. The ones I bought are used for video conferencing. When I removed the shell I found 3 boards (see figure 6). One small board has the lens mounted on it. This connects via a small ribbon cable to a large board containing most of the camera circuitry. This board then connects to an interface board. It was determined by probing the interface that the interface board could be done away with. This left only two boards that could both be placed inside the case with no problems. This particular camera even comes with an automatic IRIS. This is a must, in my opinion, as it eliminates the need for a video adjustment control on the unit. You set it for bright sunlight, and you should be able to leave the video control alone.

The final step was simply to place everything in the case and wire it together. I used small shielded coax for all RF, video, and audio connections. Plain wire was used for the rest of the connections. The large camera board was placed on top of the TV board by using double sided tape. A laminated piece of foil, that came with the camera, was placed between them as a shield. Since the TV and camera will not be running at the same time this presents no interference problems. Separate antennas were

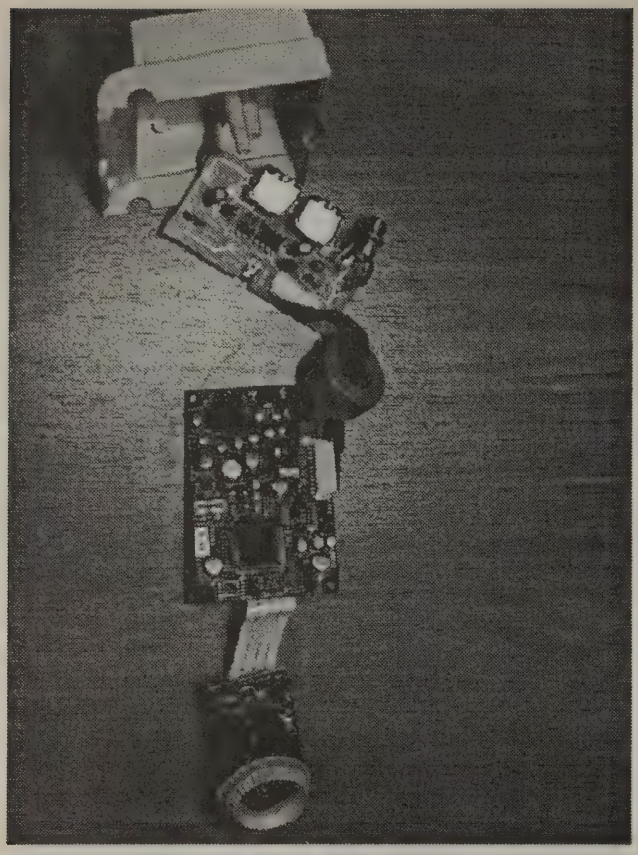

Figure 6

used for this unit. This eliminated the need for some kind of RF switch. It also gives me the future capability to both transmit and receive at the same time. This will be used for when I add a 1.2 GHz downconverter for ATV repeater use.

All in all, like I said before, this has been the most fun project I have built. This is also a work in progress that can be added to and improved as time goes by. As you can see from the figures I have not spent any time yet making it look good! This will come later. This will be a great unit to use at hamfests. With a receiver at a display table, one can run around the hamfest with this unit showing everything else off. The price of this unit is not cheap but costs about what one would pay for a high-end Ham handheld, and this one does video. As you can see from figure 7, I built a power amplifier using the 10W ATV amplifier, PA5, from P.C. Electronics. This amp puts out 10W peak with 80 mw of drive which is a perfect match for the transmitter board that I used. The Walkie Lookie with this amplifier makes a perfect mobile unit. Another project that I have been considering is to use a pair of Wavecom Jr. units to make a 2.4 GHz Walkie Lookie.

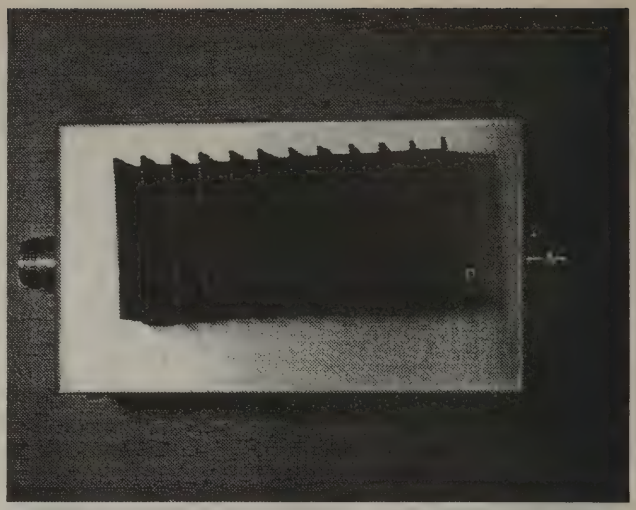

Figure 7

PORTABLE ANTENNA MAST TIP

(Taken from the December HATS meeting minutes)

Well, the idea isn't new but.. We've seen the idea of placing a board in place on the ground with mast attached and backing a vehicle onto the board to hold the mast upright. This writer was scratching his head for ideas and came upon across a couple of ideas. Telescoping paint poles can be found at builder supply stores. They are available in 12 ft. and 17.5 ft. lengths. Radio Shack (and surely other vendors) supply a roof mount tripod/mast holder. I purchased a 17 ft. pole and the tripod. Mount two legs of the tripod on a board, attach a like-thickness board to the third tripod leg, secure the mast with ATV yagis on the top section and you're in business!

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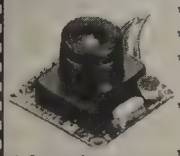

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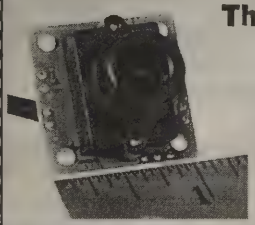

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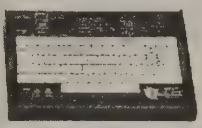

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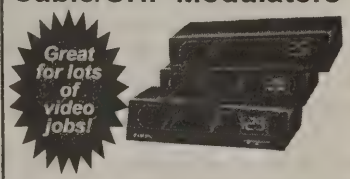

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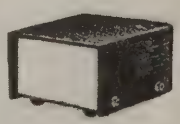

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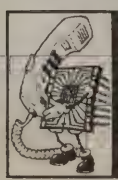

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THE PREHISTORY OF ATV

Andy Emmerson - G8PTH email: midshires@cix.co.uk
77 Falcutt Way
Northampton
England NN2 8PH

It is very difficult to say categorically who the first ATV'er was: indeed if you take Marconi to be the first radio amateur, then perhaps Baird deserves the title of first amateur television experimenter. However, although the work of Baird (and his assistants) was experimental it was certainly not connected with the amateur radio hobby. During the era of mechanical TV and televisions several hams got involved and until just two years ago there was one fast-scan ATV'er in the USA who could claim continuous involvement in amateur television of one kind or another since those early days.

His name is Mel Dunbrack, W1BHD, and to use his own words, he had been "fooling around with television reception and transmission since 1923." At the last report he was still active on ATV, FAX and the HF bands, as well as being a member of AMSAT, having watched the Russian Sputnik fly over the USA. Henry Ruh told me that Mel was licensed as W1BHD-TV, the only ham to ever have officially such a suffix. Amazing stuff.

Once television experimentation started on a commercial basis in Britain, the USA and Continental Europe, these activities began to attract public attention and a number of companies sold kits of parts for constructing electromechanical receivers for the experimental transmissions. Magazines published constructional articles and many enthusiasts became amateur television experimenters. The vast majority of them were not radio amateurs and because they were involved only in receiving, not transmitting, we do not count them as true amateur television operators, at least in the sense that this article is concerned with.

Figure 1. The first amateur television transmitting station in Britain - G2AO, Owen Relly, based near Eastbourne. Photo taken 1934 or 1935. Copyright Ray Herbert G2KU.

Here is a chronology of amateur television transmitting activity in the early days.

1926. The callsign 2TV, later G2TV, was issued to Television Ltd (later known as Baird Television) in Britain and its license was the first in the world issued specifically for the transmission of television pictures. This was a commercial venture and 2TV was not an amateur callsign. All the same, three radio amateurs (G2KZ, G2SH and G5PV) were involved with the design and construction of the 250W 200-metre transmitting equipment used at the station.

1927 Vision signals transmitted across the Atlantic from 2KZ in Britain. No pictures in New York, as TV receiver not available. See Daily News 22nd April, 1927.

1928, February. World's first transatlantic television transmission of live pictures from amateur radio station G2KZ at Warwick Road, Coulsdon (south of London) and received by Robert Hart, W2CVJ, and Ben Clapp, G2KZ, in New York. Detailed write-up with photographs in Royal Television Society Journal, January 1988.

1928, March. Live TV pictures received on SS Berengaria in mid-ocean. Video recordings made on a gramophone record by W2EB and W2BUO.

1928 or 1929. A Mr. Jack Porter built a closed-circuit 30-line television system and demonstrated it at his shop in Worcester, England. This is recalled by Grant Dixon, G8CGK, who knew Mr Porter.

1932 Australia. Amateur station VK2KI transmitted 30-line pictures on 136 metres. This was a Waverley Radio Club project.

1934, January. G2AO, of Eastbourne was transmitting 30-line TV on 160 metres. See RSGB T & R Bulletin July, 1934, page 31. "I received amateur TV signals on 40 metres on 15th and 22nd July at 22.00 but could not get a picture."

1934, December. 30 and 60-line transmissions made by H. Bailey, G2UF, of Denton, Manchester, on 10 metres. See Practical Television, January 1935. The Royal Television Society has a photo.

The next mention of ATV in this country appears to be a note in Wireless World (3rd April, 1936) entitled 'Amateur Television in Yorkshire'. The text is one tantalizing sentence and reads "The Yorkshire Television Association is applying for a license to erect an ultra-short wave station at Gilderstone, near Leeds, for television experiments." It would appear that not a great deal came of these, although closer scrutiny of subsequent issues of Wireless World, the RSGB's T&R Bulletin and the local newspapers might bring something to light.

More 10 metre ATV activity followed. In Portsmouth, station G6PU radiated experimental transmissions using a 25-watt vision transmitter on 10 metres; it was located at the Portsmouth Municipal College. There is a photo of the station in the 28th July issue of Wireless World.

A short paragraph entitled 'Amateur Television' appears in the January 1939 edition of Television and Short Wave World, and reads as follows:

"Some American amateurs have recently installed a fairly high definition television transmitter which they are operating on a frequency of 57 megacycles. Members of their society have built their own receivers with miniature tubes, and considering the difficulties, results, it is stated, are quite satisfactory. British amateurs are limited as to the amount of work they can undertake, for television licenses are difficult to obtain with transmissions restricted to a frequency of approximately 29 megacycles, while only one picture per day can be transmitted" [author's emphasis; this may well be incorrect].

The story now moves to the USA and the New York World's Fair of 1939. Dave Ingram writes in Video Electronics Technology that ATV was demonstrated in the ham station there. "The managing director of W2USA, Art Lynch, W2DKJ, (now W4DKJ), after seeing a successful demonstration of amateur television equipment at a radio show in Chicago in June, was convinced that television communications should be added to the station at W2USA, "the most visited amateur radio station in the world". Since the World's Fair was scheduled to close at the end of October time was short, but Art lined up the necessary talent, and with some help from industry, the group built two complete television systems in an effort to establish the first two-way television contact.

"Their goal was accomplished on September 27, 1939, when amateurs at W2USA and W2DKJ/2 at the New York Daily

Figure 2. Amateur television transmitter by Owen Relly G2AO. This picture shows the 30-line scanning gear, with a photocell in a saucepan! The wavelength is 160 metres. Photo copyright G2KU.

News building in Manhattan began exchanging fair quality television pictures on the amateur 112MHz band. Accompanying sound was transmitted on 56MHz. Distance between the two stations was about eight miles.

"The television equipment at each end of the circuit consisted of a camera-modulator unit, a receiver and a transmitter which were duplicates of equipment described earlier in QST. The system used 30Hz vertical scanning, 3600Hz horizontal scanning and a 120-line raster. Considering that the pictures were viewed on a CRT with a P1 phosphor, the results were quite gratifying. Each station boasted the very latest in electronic equipment, including electro-magnetically deflected cathode ray tubes, free-running sweep tubes synchronized by external pulses, and iconoscope camera tubes. The equipment was donated by RCA, National, Hallicrafters, Hammarlund, Thordarson and Kenyon. The station at W2USA used a single 1000 watt lamp for subject illumination, while W2DKJ/2 had a battery of smaller lights with reflectors.

"A number of amateurs in the vicinity of New York were working on their own television receivers, and on October 15 W2AOE put on a demonstration for members of the Northern Nassau Radio Association by receiving TV signals from the 20 watt station at W2DKJ/2, seventeen miles away. The range was increased to 29 miles on October 19 when good quality TV signals were received at W3FRE in Denville, New Jersey."

Another description of pre-war amateur operation in the USA is to be found in the December 1942 issue of Electronics magazine, where Robert Mautner and Frank Somers (calls not given) describe their extremely professional camera, monitor, sync pulse generator and transmitter. This equipment, they say, was constructed just before the war and used successfully in the 114MHz band for several months. The comprehensive list of references also mentions a couple of articles on ATV in the May

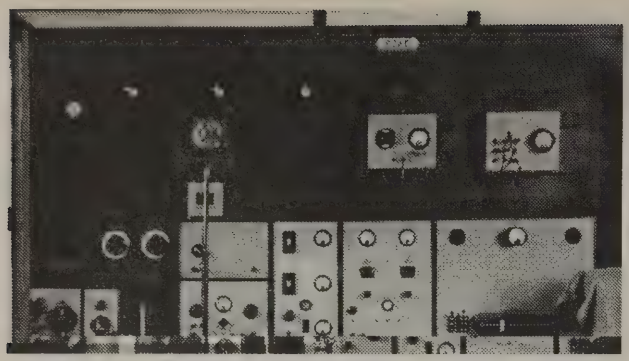


Figure 3. The radio room and mast of Owen Relly G2AO in 1934 or 1935. Photo copyright G2KU.

and July 1940 issues of QST. All these transmissions were on the then-current American standard of 441 lines, with 60Hz vertical frequency.

The war put a stop to further ATV development and the next mention of this subject occurs in 1948, in the British magazine Mechanics. The 15th October issue devoted its centre spread to an Australian ham, VK3LN, who had built his own television camera and receiver. The system's line standard is not mentioned but the illustrated article stated that he proposed to transmit speech on 144 megacycles and that clear vision reception was expected within line of sight.

We move on to the year 1950, when W2LNP in the USA published a three-part article in Radio and Television News describing his home TV station. This conformed to the very same standards used by American broadcasters, namely 525 lines, 60 fields, audio subcarrier and transmitted on the 420-450MHz band. The article is extremely progressive for its time and set the scene for all subsequent development, which can be traced in QST, 73 and A5 magazines.

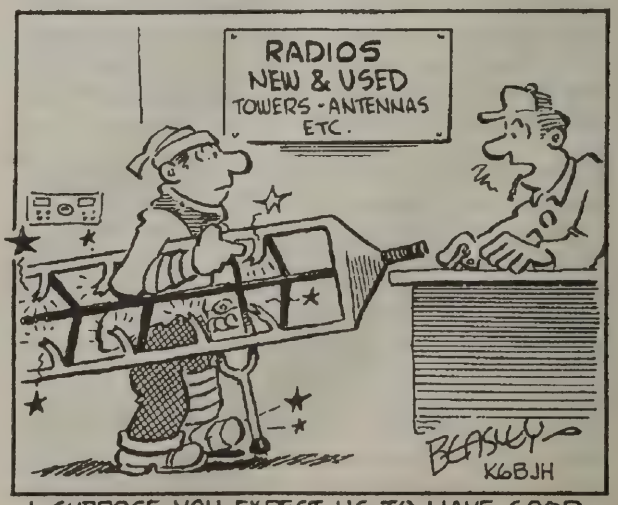
It is now 1951 and we take a visit, remarkably, to the Soviet Union. Amateur construction of television station and receiving equipment is highly developed in the Soviet Union. According to the OIR Bulletin of 15 June 1951, the initiative in the construction of a television centre was taken by radio amateurs of Kharkov, one of the greatest industrial and cultural centres of the Ukrainian SSR. While constructing this television centre, the amateurs had to overcome many technical difficulties such as the elaboration and perfection of different parts of this complicated system. The initiative of the Kharkov radio amateurs was supported by the authorities, and workers in many Kharkov enterprises devoted their leisure hours to making free of charge, transformers, transmitters and rectifiers, aerials and other accessories.

The television centre constructed by the Kharkov radio amateurs is operating successfully. The "stable zone" of this centre is 20 to 25 km. Its sound and picture transmissions can be received not only on the KVN and Leningrad T1 sets manufactured in Soviet radio workshops, but also on receivers built by amateurs. Radio amateurs, in many other towns of the country, inspired by the successful experiments of the Kharkov centre, are also beginning to build television centres.

Continued operation of this centre was reported by OIR in February 1952, in an article which said that amateurs had been constructing "television distribution centres, relay stations, simple and inexpensive amateur television sets, devices for relief and colour television, television apparatus requiring a small number of valves intended for mass production and many other apparatuses and devices".

Various publications aid the amateur in his work, including the following books: 100 Answers to Questions by Amateurs on Television; Television Receivers and How to Control Them; The Technique of Demonstrating Television; Amateur Television Receiver LTK9, by A. Kornainko; Amateur Television Receivers, by J. Bardah and L. Troitzky. A note about the last book states: "The authors give a survey of peculiarities in the construction of amateur television receiving sets; they describe receivers equipped with cathode ray tubes of 5, 7 and 12 inches. The book is written for readers with technical knowledge of television."

(This fascinating excerpt is from a UNESCO (United Nations) handbook entitled Television, A World Survey. It was published in 1953.)



I SUPPOSE YOU EXPECT US TO MAKE GOOD ON THAT

Product Review

VS-90 ATV Repeater Controller

by: Ron Wright, N9EE/R email: n9ee@imsweb.net
8849 Gum Tree Ave.
New Port Richey, FL 34653

How many of you are transmitting ATV? How many are just receiving ATV. How many are doing both? How many are operating through an ATV repeater?

Twenty years ago an ATV'er had to have at least 200 watts usually using a cavity tuned tube type transmitter to have any kind of signal to enjoy the world of ATV. Well, the world has changed with all the innovative hams and advancing technology of ATV. Ain't this hobby great?

The world of repeaters has changed VHF, UHF, ATV and ham radio forever. Now an ATV'er can have his own small camcorder, VCR, cable ready TV, a 10 watt ATV transceiver and one is up and running making pictures and having a good time.

There are many good manufacturers of ATV transceivers making it easy to get into a good repeater. However, it is the repeater that does most of the work. God would have had ATV repeaters in the Garden of Eden, but he had other things to deal with at the time. However, He did get around to the ATV creation on the 8th day.

By now, most all know a repeater works best with some kind of controller. There are few ATV repeater controllers on the market. A company known as Micro Computer Concepts (MCC) is the manufacturer of a near complete controller for ATV (there ain't no such thing as a complete repeater controller). MCC has developed, and is now marketing, the VS-90 ATV repeater controller.

The VS-90 is a microprocessor based, 87C751, repeater controller dedicated to ATV repeater use. It has 4 receiver inputs, each with video and audio, a video ID input, and a control receiver input. The outputs are video, 75 Ohm, and audio, 1 kOhm.

The controller is contained on a single 7.3 x 6.2 PC board including the power supply. Pots are provided for each video and audio inputs. Also there are pots for the video and CW ID levels.

The VS-90 is DTMF programmable, allowing the control ops to program the various control codes, CW ID, mode selection, time-out timers, etc. This is performed remotely via the control receiver input with DTMF.

The controller offers a number of operational modes. The most used is the repeater mode where the selected receiver inputs are sampled for horizontal sync. I mention the selected receiver inputs for any of the inputs can be selected as the receiver input. When a receiver input sync is detected the transmitter is keyed. This is the same type of operation as a voice repeater having an input and keying the repeater transmitter. Once the video input is removed the video ID input is selected and the repeater keeps the repeater keyed for the programmed tail time, .2 to 25 seconds. A special control code can force the VS-90 to keep the transmitter keyed never dropping the PTT. In this mode the video ID input is transmitted until a receiver input occurs.

A time-out timer, programmable 20 seconds to 40 minutes, limits a users transmission. This time-out timer can be disabled if desired.

Any of the four inputs can be selected as the receiver input or a receiver scan mode can be selected. If only one receiver is used then that input is the only receiver sampled leaving the other inputs for other video sources such as weather radar, space shuttle, etc. However, if the repeat scan mode is enabled, the programmed inputs, one through four, are scanned and if video is detected on an input that input is locked to and the repeater keyed. In the scan mode any or all of the inputs can be selected to be part of the receiver scan inputs. As an example, if input 1 were for a 439.25 receiver, input 3 were a 910.25 MHz receiver, and input 4 were a 1.2 GHz receiver, then the controller can be set up to sample and scan inputs 1, 3, and 4. The scan option is programmable allowing for the selection of any and all of the inputs. Also, at any time, any of the inputs can be deleted. However, at least one input must be selected.

Another useful mode is the manual mode. In this mode any of the 4 inputs or video ID input can be manually selected and retransmitted. The transmitter remains keyed while in the manual mode.

A built in CW ID is provided for identifying the repeater, and when identifying, the video ID is also transmitted. Also to

advertise the ATV repeater, the control can be placed into the "BEACON" mode where the VS-90 will video and CW ID the repeater every ID interval without the repeater being in use, thus, the ID is transmitted every ID time interval. This is useful for checking for band openings. The funny thing about band openings, no one knows about them unless someone transmits. The ID interval is programmable from 20 seconds to 40 minutes. The CW ID can have up to 15 characters.

The VS-90 has two test modes; the receiver test mode and transmitter test mode. When the receiver test mode is selected the repeater transmitter is keyed for 1 minute and the repeater receiver input is selected without the need for sync. This mode is useful for aligning the users transmitter.

The transmitter test mode allows a user to force the repeater to switch to the repeater video ID input and transmit for 1 minute. This allows the user to align his receiver to the repeater.

All control of the VS-90 is via DTMF and the control receiver. Any DTMF audio is acceptable, a user supplied DTMF pad on the repeater front panel, control receiver on 2 meters or 440, etc. or any DTMF audio source will be accepted by the VS-90.

Figure 1 shows a block diagram of the VS-90. Note the video and audio switching arrangement. The receiver inputs enter into a single dual 4-to-1 mux. The control from the CPU selects the video/audio input at the same time. This mux output is routed to a second 2-to-1 mux which selects the receiver mux video or the ID video. To prevent phase shift of the video, an audio DC coupling is employed through out the VS-90. If receivers or other video and audio sources have DC bias, capacitors will need to be inserted in these inputs.

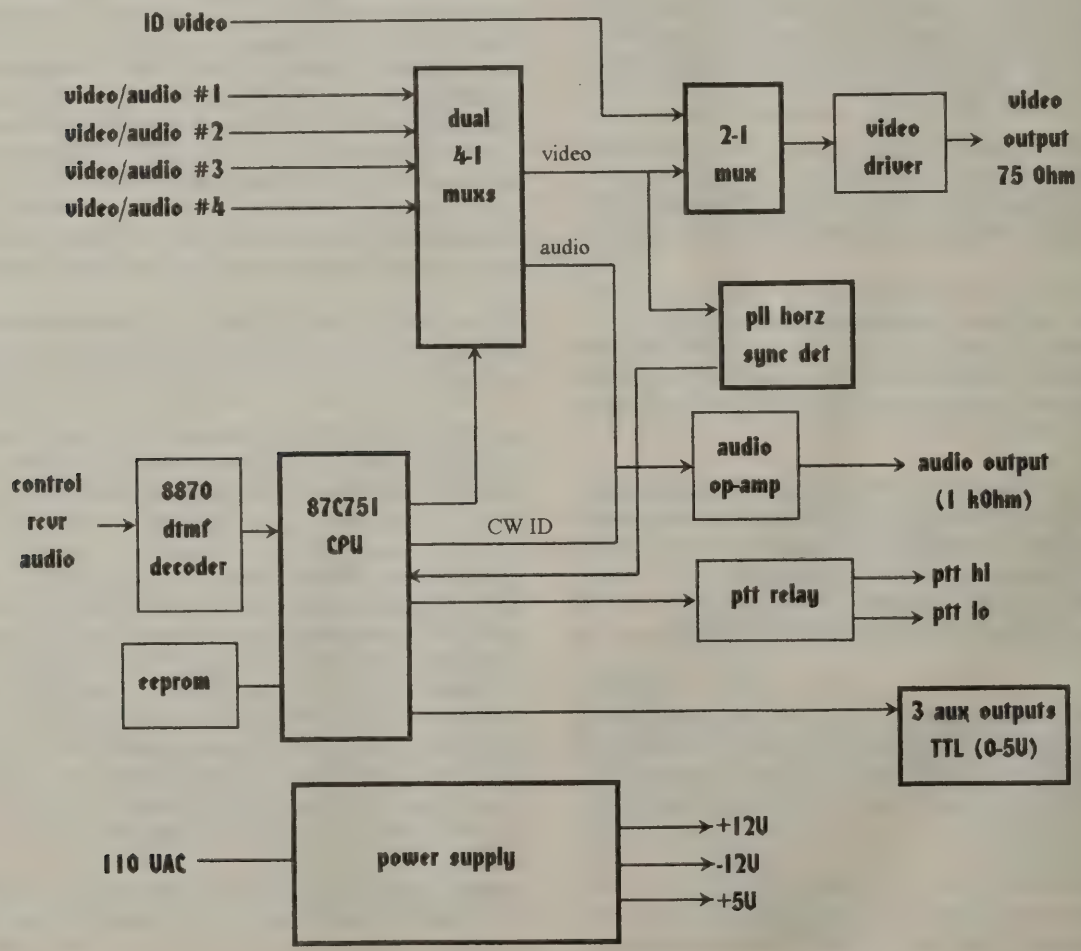


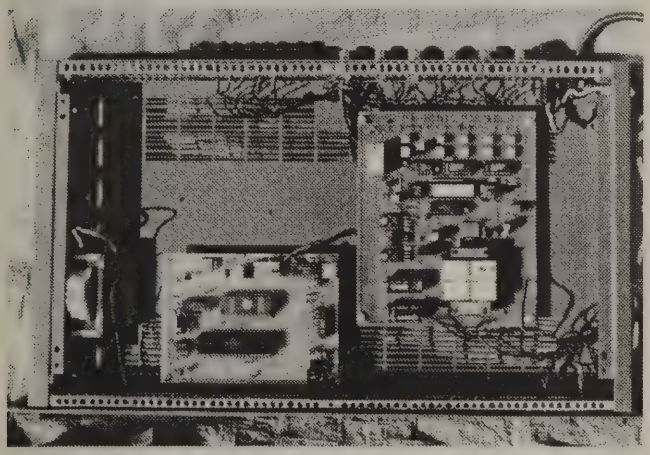
Figure 1. VS-90 block diagram.

The sync detector input is connected to the receiver mux output only. Video is detected with a phase locked loop pot adjustable to the 15734 Hz horizontal sync frequency. The sync detector only samples the receiver inputs. This allows the VS-90 to look for receiver video while transmitting the video ID.

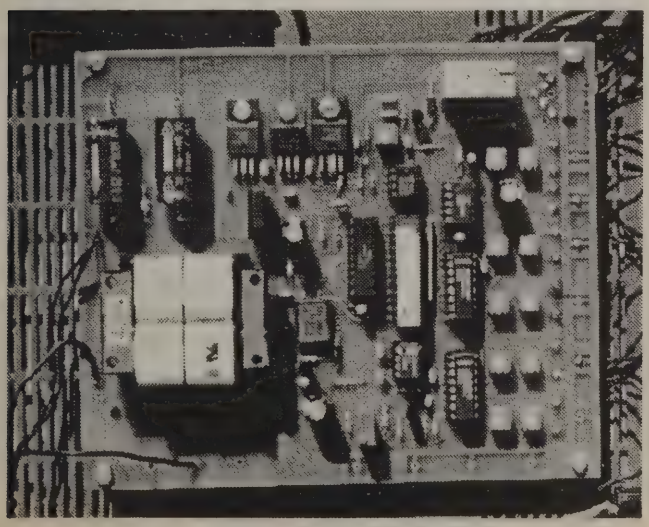
All setup, programming and control, is with DTMF from the control receiver input. The CW ID, time-out, tail timer, control and user DTMF codes are remotely programmed with DTMF.

The procedure for programming requires the entry of two user programmable control codes. Then by entering a select code for the item to be programmed followed by the desired entry (code, timer, etc.).

The CW ID is programmed by using a special control code to place the control into the CW ID programming mode and by using a 1 for a dit, a 2 for a dah, * (star) for next character and # (pound) for end of ID programming the ID is entered. The CW ID can have up to 15 characters.



Inside the VS-90 with the Elktronics video ID



VS-90 Printed Circuit Board

All programmable items as well as the operational state of the VS-90 are stored in EEPROM retaining memory for up to 40 years. Thus, if power is lost the controller will retain the programmed information and also retain the state of the repeater and place it in the selected mode when power is restored.

The VS-90 has three DTMF controlled logic outputs. These are simple latched ON (high) or OFF (low) TTL, 0 to 5V, outputs for use as the repeater system needs.

The PTT circuit is from 2 dry relay contacts, both brought out for ground or apply voltage keying. When the PTT is engaged these contacts simply close. The user is to either connect the PTT to ground, or route the necessary keying voltage through the contacts to apply the necessary keying voltages to the transmitter.

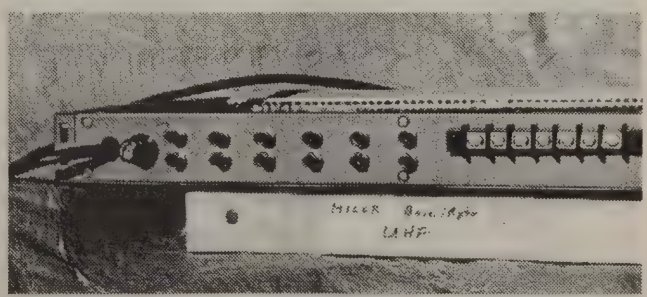
The VS-90 can be purchased as a single tested PC board or in a 19 inch, 1-3/4 inch high by 10 inch deep enclosure. The 19 inch enclosure has 12 rear mounted phone connectors for the 4 video/audio receiver inputs, video ID input, control receiver audio input, video output and audio output. The PC board does not have these connectors, but the power supply is included.

Power requirements are 105 to 130 VAC at about 300 ma. A built in power supply provides for three regulated voltages of +12V, -12V and +5V. This might be a problem for battery operation.

The VS-90 board alone is $299.95 and with the enclosure it is $359.95.

The enclosure has about 60% of the inside open for other items such as the ELKTRONICS video ID board. However, any additional hardware placed within the enclosure must be powered by another power source for the VS-90s power supply, although more than what is needed to power itself, there is not much left for other uses.

At present I know of no other ATV repeater controller on the market with features of the VS-90. It offers much for the ATV repeater users.



VS-90 Rear Panel

J. Rene - UP & DOWN

by Gene Harlan - WB9MMM email: atvq@aol.com
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Rockford, IL 61108

It is not often that you have really neat things happen close to home, but I had one happen to me just a couple of weeks ago. Kevin Uliassi, a Chicago architect, was to launch a balloon from Rockford, and try to fly around the world. The launch site was a quarry about 3 miles from my home and about one mile from where I work. This was something I had to see for myself. But, I would not be satisfied viewing the take-off from the top edge of the quarry, I wanted to be where the action was.

In all the news stories, they mentioned a Rockford member of the balloon crew, Bill O'Donnell. I looked his number up in the phone book. He was very cordial, and thought there would not be any problem of my joining the news media in the pit. This was several weeks before the flight . At the time, they were waiting for good weather and permission from countries like China and Russia to be able to fly over their countries. It was a day by day wait to see when they would launch.

It was finally announced that they would take off around sunset, New Years Eve. I usually am asleep by 9 pm on New Years Eve, but this year was different. I was ready to stay up as long as it took to see Kevin start on his journey.

After checking with Bill O'Donnell, it was decided that I should arrive around 3 pm so as not to miss anything. I was interested in talking with Kevin, if I could, to see about his communications equipment that he would be using. Also, I was hoping for enough daylight to get pictures of the balloon inflating, etc. I had no idea how much light there would be for taking pictures after dark, but I figured they would have some spotlights. For film, I used Kodak Gold 800 Max (never had tried it before). It turned out to be a good choice.

I arrived at 3 pm as planned. At the gate, I was stopped and had to sigh a form - something about if I got hurt... There was a parking lot at the top of the quarry where everyone had to park. The only ones that drove down into the pit were the TV trucks and the balloon team. There were busses waiting to take people in and out of the quarry as needed. Talk about TV trucks! Figure 1 shows a few of the trucks with their satellite dishes. The quarry is 375 feet deep. I was barely able to bring up the local repeater to keep my wife (Shari - KB9SH) informed. I found out later that there were many people listening in on the conversations.

I walked around to see what was going on, and found the balloon laying flat on the ground, all spread out. I was very surprised that we were able to walk right up to the balloon, and wondered if anyone could have accidentally stepped on it. It seemed rather risky to allow people so close. At one end they were working on the gondola. I had expected more to be hooked up at this point, as if I knew anything about what was going on. The gondola was nothing to look at, as you could barely see it due to all the tanks surrounding it as shown in Figure 2. I was told that the tanks with helium were worth $5000 each, and when empty, Kevin would just cut them loose, letting them fall! Seems like a waste, but they need to drop the extra weight when they are done with the tanks. The same thing happens to the batteries that power all the radios.

Figure 1. First view was all the TV and media vehicles.

Figure 2 Gondola loaded with helium tanks.

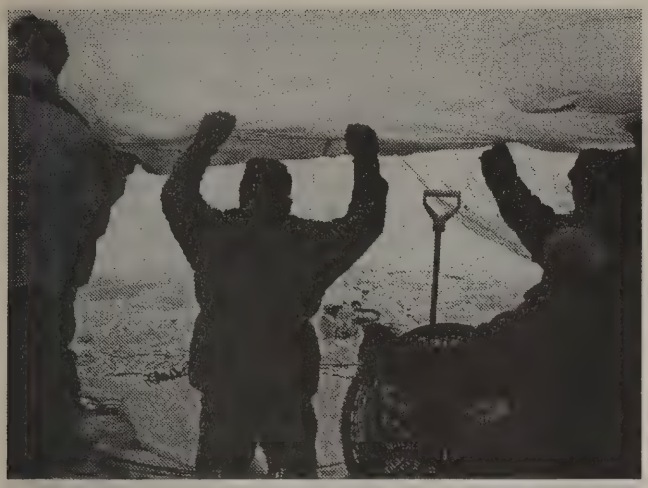


Figure 3 Gas powered fan inflates the hot air section (bottom) of the balloon.

Shortly thereafter, they started a gas powered fan, and blew air into the bottom, or hot air, section of the balloon (Figure 3). The purpose was so they could walk around inside and straighten out all the control cables that go from the gondola to the helium part of the balloon on top. Later that night, they would find that one of the cables that goes to the top helium section was tangled, but more on that later.

As I had hoped, Kevin came to the balloon to see how things were going. The media was all over him, with this reporter trying to do what he could to compete with CNN, ABC, NBC, CBS, and all of the local and Chicago based news teams that were there. As it happened, Kevin seemed to have time for everyone, including me!

I talked with Kevin about his communication equipment, of course. He told me that he would be communicating in a variety of ways, but mostly by teletype. His responses would come by email. He also had aircraft radios, a GPS which would automatically transmit his position on a regular basis. Most of his communication would be through satellites. Asked if he had any TV cameras on board, he replied there would be one inside the gondola, and one from each of two booms attached to the gondola that would be pointed at the top. The only access Kevin has to get in and out, and to be able to view, is a porthole on the top. Kevin would be getting out during flight (standing up in the gondola with his head outside) to change tanks and other duties as needed. Sounds like a mighty cold job to me.Figure 4 shows Kevin and wife, after whom the balloon was named.

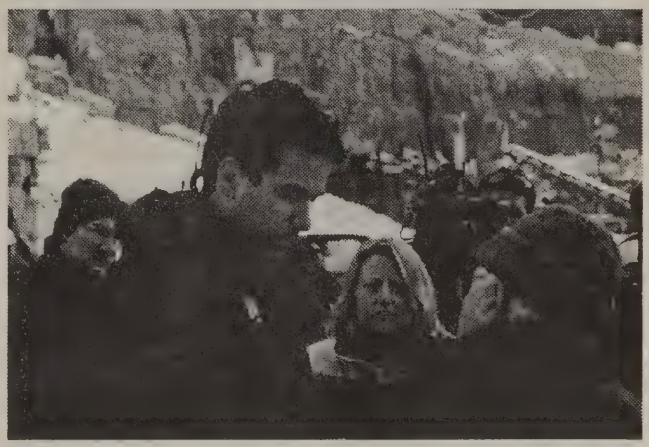


Figure 4 Kevin Uliassi and wife surrounded by the media.

In Figure 5, you can see the size of the balloon, and this is just the hot air part. I was disappointed shortly after, to see they let it all deflate. I thought we were on our way. I did not realize that they had to fill the helium part first. The only reason to inflate the bottom was to check out the balloon and cables.

Soon they were attaching the helium hose from the trucks to what looked like barrels. The barrels (I'm guessing) would take

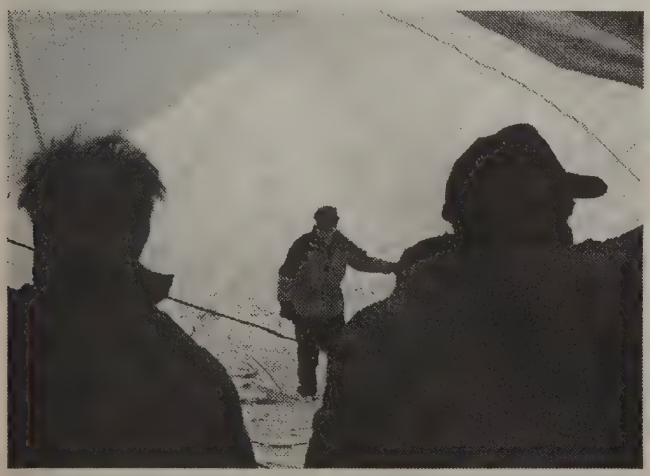


Figure 4 Inside the hot air section checking cables.

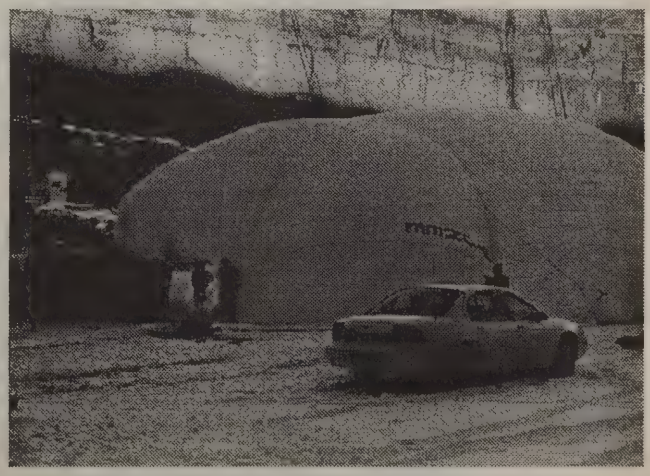


Figure 5 Bottom inflated for checkout.

Figure 7 Hooking up the helium hose to the barrels. The feed tube slid over the outside of the barrels

Figure 9 Trying to untangel control rope that goes up inside the balloon took an extra 45 minutes.

the high pressure of the helium gas. When they did turn on the helium to fill the top portion of the balloon, the gas billowed through the fill tubes, and looked like a liquid was flowing in them. I was told to bring earplugs as the sound of the helium filling would be loud. It was, but I did not need the ear plugs.

By this time I was feeling the cold. It was between 12 to 15 degrees outside. We were able to go to the buses whenever we needed to get warm. At least there was not much of a breeze, as we were 375 feet down in the ground.

There were two hams on the balloon crew that I met. One was installing the antennas on the two booms that stuck out from each side of the gondola. He was commenting that there was nothing better than a homemade antenna, and, with that, I knew he was a ham (Figure 10).

The other ham was Admiral Finn, KB9NQE, from Hampshire, IL. I had a nice conversation with him, and learned quite a bit. He informed me that communications equipment consisted of Inmarcat satellite teletype, GPS, aircraft radios, all being run with 374 lithium sulphur dioxide batteries ($44 each). The batteries are ballast once the are used up and are thrown overboard. His messages will come back through the satellites via e-mail.

The only visual views Kevin will have is from the porthole on top of the Gondola. There are not any TV cameras pointing down, or outside, except for a camera on the booms pointing towards the bubble on top of the gondola to record his outside activities such as changing tanks. There is a camera inside the gondola also to record happenings there as well.

While I was talking with Admiral Finn, other members of the balloon crew were very busy trying to untangle a control line that went up inside the balloon to the top helium part. They could not take off with it caught up they way it was. They finally had to get a bucket truck and very carefully lift the outside skirt of the balloon until they could free the control line with a

Figure 8 Author had picture taken by NBC news crew.

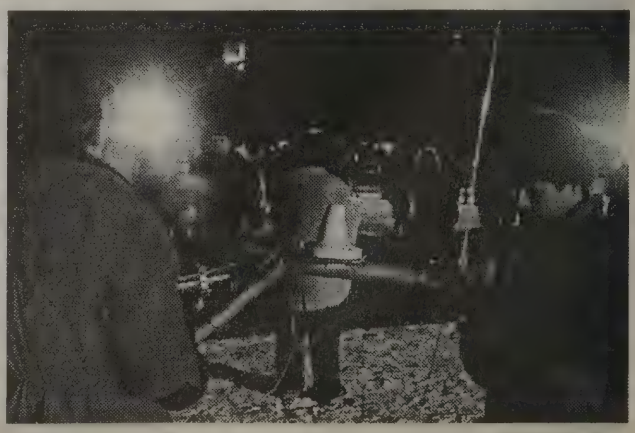


Figure 10 Antennas were not commercial. Ham on right installs just before liftoff.

long fiberglass rod. It took about 45 minutes to do that. After it was freed, everyone started through all the final checks.

Kevin came out to start his checkout. As soon as he felt comfortable, his wife came out, and climbed the step ladder to say good-bye. After a kiss (lots of applause from the news media present), she handed him a homemade pie wrapped in aluminum foil for the trip.

Soon, the ropes holding the gondola from floating away were cut, and the crew walked the balloon over to one side of the quarry. With a quick firing of the burners, he was on his.way, taking only about 15 seconds to clear the rim of the quarry. Spotlights followed him for as long as they could.

Unfortunately, as we all know, his flight only lasted a few hours, and he landed in Indiana. There was a problem with a tear in the helium portion of the balloon, which would prevent him from continuing. We also know that the group in New Mexico came down for the same reason, and the balloons were made by the same manufacturer in England.

Kevin says he may try again. You may follow his efforts on the web at **http://www.j.renee.iit.edu**. There is lots of information, including some which I printed on the next page.

LEFT **Figure 11 Balloon inflated and waiting for all the last minute details before takeoff.**

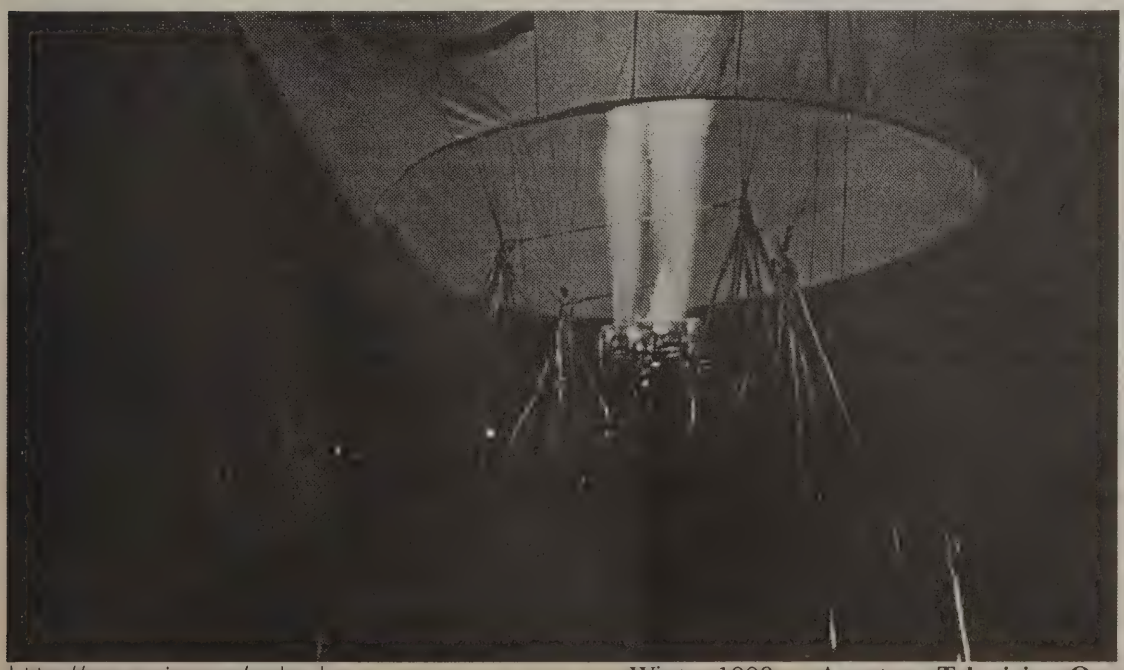


Figure 12 Takeoff at 8:45 pm. What a sight! It only took agout 15 seconds from the time he fired the burners to the time he cleared the rim of the quary. Spotlights kept him in view for a short while.

Specifications From The Internet

Control & Communications

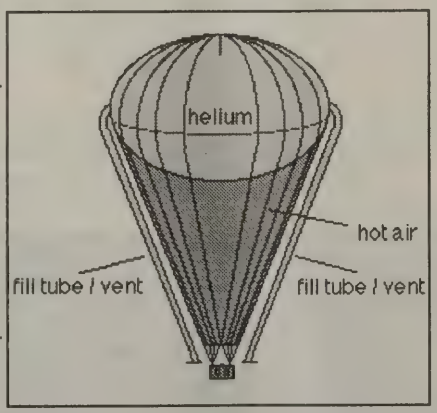
Instrumentation

A Trimble Navigation Inmarsat C satellite teletype (E-Mail) will serve as the primary communication link between the balloon and communications center. It also automatically transmits critical information such as balloon altitude and position every half-hour, with position determined within +-100 feet. A dedicated GPS is also carried. Other instruments include an HF radio, handheld radios, and a VHF aircraft radio for air traffic controller communications; two aircraft transponders, with altitude encoders; an emergency locator transmitter; satellite rescue beacon; and a water-proof marine band radio for communications with boats. Permanently mounted equipment and instrumentation will be powered by some 600 pounds of lithium sulphur dioxide batteries from Eveready Battery Company, St. Louis, which has also provided Energizer AA lithium batteries for handheld backup equipment.

Equipment

Envelope

The gas cell - the upper portion of the envelope - is a nearly spherical bag made of two fabrics: .03-inch-thick nylon oxford cloth (200 denier) on the upper part of the cell and .015-inch nylon taffeta (70 denier) on the lower portion. Both parts are coated on the inside with polyurethane; the top portion is also coated on the outside with an ultraviolet light inhibitor to prevent sunlight from weakening the fabric during the extended flight. The coatings were specially developed and applied by Lamcotec, Inc., Monson, Massachusetts. The cell, which is sewn to the hot air cone, measures approximately 90 feet in diameter and is filled with about 280,000 cubic feet of helium gas at launch. The apex of the balloon is fitted with a 16" diameter stainless steel valve that can be opened with a line from the gondola to exhaust helium during landing. Two chimney vents, tucked inside the gas cell, can also be activated from the gondola during landing or an emergency, emptying the cell within 20 seconds. The cell is filled through two long tubes, which also vent excess helium as the balloon rises. About 70 percent of the helium will be vented during the flight; less than 1,000 cubic feet will be lost daily through leaks, however. The hot air cone is composed of 80 gores of .01-inch -thick, 1.6-oz ripstop nylon, also coated inside with polyurethane. Nylon load-tapes run from the bottom of the cone to the top of the gas cell. The cone has a capacity of 120,000 cubic feet of hot air. The entire balloon will be white, with the cone having a sheen typical of nylon.



Gondola

The gondola is designed to shield the pilot and his electronic instrumentation from the extreme cold of high altitude flight (about -50 F at 30,000 feet) and to survive the equivalent of an impact that would result from a descent at 800 feet per minute. The 6" thick walls are a sandwich of modern composite materials, selected for their lightweight and toughness; polyisocyanurate foams covered inside and out with a skin of fiberglass, carbon fibers, and kevlar (used in bullet-proof vests) in an epoxy matrix. The gondola, built by Fabrication Specialties, Inc., Fife, Washington, has interior dimensions of 6'-8"x4'x5' (LxWxH) and weighs 230 pounds when empty. It is attached via eight .25-inch diameter stainless steel aircraft cables to the underside of a standard hot air balloon burner frame. The pilot can see the burner and envelope interior through an observation bubble in the gondola's hinged hatch just above his seat. The gondola is equipped with a special heater, custom-designed by DesChamps Laboratories, Inc., Natural Bridge Station, Virginia that will maintain temperature within the gondola at a minimum of 45 F when the outside temperature is -50 F.

Flying

Altitude Control

Helium is lighter than air and thus lifts the balloon as it rises. During daylight hours, solar heating and subsequent expansion of the confined helium in the envelope impart additional lift, sufficient to keep the 12,500-pound balloon aloft. However, at night when the helium cools and contracts, lift is reduced and the balloon begins to sink. In an ordinary gas balloon, ballast is simply thrown overboard to keep the balloon from falling to the surface. In a Rozier, the helium is heated at night (and during the day when it is necessary to climb) by hot air flowing upward from the propane-fed burner at the bottom of the balloon. The heat thus prevents cooling and contraction of the lifting gas, preventing loss of altitude by the balloon. The balloon is equipped with a quad-burner unit, whose four burners can be operated separately or in any combination. The burners, which are controlled by an autopilot, are fueled through a valving and storage system from a blend of more than 4,000 pounds of propane-ethane in 20 titanium tanks suspended around the perimeter of the gondola. Empty tanks can be dropped as ballast when necessary.

More info: **http://www.j.renee.iit.edu**

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ATVQ ON THE WEB

Don't forget that due to the courtesy of Dave Stevens and Fred Juch of HATS, we have a web site with much information about ATVQ. You will find:

1. List of ATV'ers (5500)
2. ATV Repeater Listings
3. Index of ATVQ articles

and MORE!

We would like to include information on repeaters, and some information is starting to come in. Please make sure that we have YOUR repeater information so it can be included. Information can be emailed to:

ATVQ@aol.com

The address of the web site is:

http://www.stevens.com/atvq/

Please visit it often. Suggestions are welcome.

73 - Gene Harlan - WB9MMM

Blue Screen

From the Internet

Hello All:

The other night on our ATV net, the question was asked: "How can we work a weak signal UHF (Cable ch 57 or 58) if the Cable Ready VCR we are using puts a blue screen on the TV under weak signal conditions?"

I volunteered to call JVC, since that is the brand I am using. The answer I received was that the TV set does the weak signal blue screen processing, not the VCR. JVC calls it "Noise Mute".

So, we are back to the same question ... except substituting TV for VCR!

Any thoughts?

Thanks
AL
wa4ewv@amsat.org

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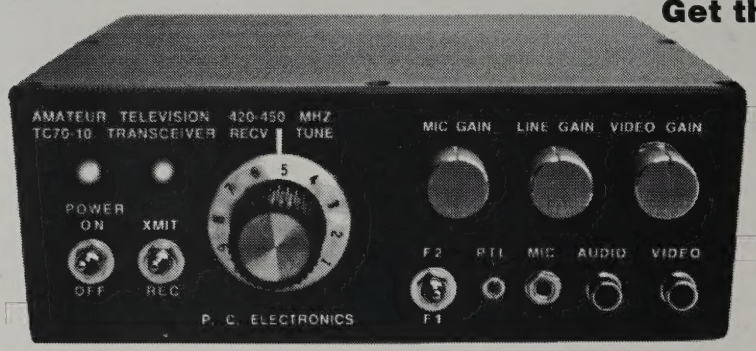

TC70-10 Transceiver lets you get on ATV right away with all the power most will need in one box - *90 Miles line of sight DX

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*DX is up to 90 miles snow free line of sight between 14 dBd beams and using 100 ft. of Belden 9913 low loss coax simplex. Check the ARRL Repeater Directory for ATV repeaters near you or call us for info on other ATVers in your area to find out frequencies, antenna polarization and activities.

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COMPLETE 420-450 MHz 70cm BAND ATV STATION

Your TV set

Your video camera or camcorder

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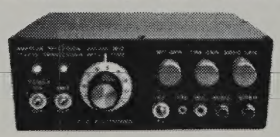

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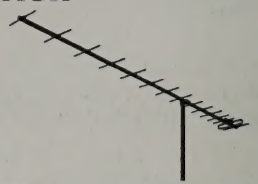

Antennas - see catalogue page 5

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